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Journal of ORAL SURGERY

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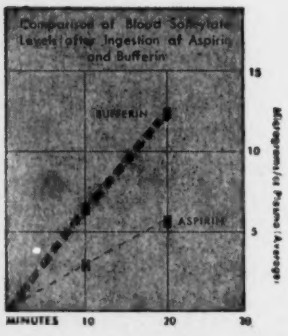

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A JOURNAL

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JOURNAL OF ORAL SURGERY

Fred A. Henny, D.D.S., Editor

HENRY FORD HOSPITAL, DETROIT

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Unilateral hyperplasia of the mandibular condyle

■ *Wilbur N. Van Zile, D.D.S., Oakland, Calif.*

Unilateral hypertrophy of the mandibular condyle, which is encountered rarely, has been variously reported as osteoma, exostosis and hyperplasia. Cases of unilateral condylar hypertrophy in association with elongation of the ascending ramus have been reported even more rarely. Elongation of the ramus was described in only 7 of 29 cases reviewed by Rushton.[1] An instance of such elongation is reported herein because of its rarity and the manner in which surgical correction of the prognathic facial deformity and malocclusion of the teeth was accomplished.

■ *Etiology*

The etiology of unilateral condylar hyperplasia is obscure. The disorder has been variously described in the literature as exostosis, osteoma and hyperplasia. Rushton[1] states,

> In several respects the disorder is comparable with the single cartilage covered exostoses of the long bones . . . Both occur at sites where precartilaginous tissue exists and persists through a great part of life. The principal differences appear to be that in the case of the jaw the excess bone is often remoulded to serve a functional purpose, that no sex difference is so far apparent in the mandibular cases, and that (so far as I know) malignant change in them has not been recorded.

In classifying the disorder as an osteoma, Worman and Waldron state,[2]

> . . . there was an enlargement of the entire head [of the condyle] rather than projections of a growth from an otherwise normal appearing condyle.

This viewpoint does not take into consideration the elongation of the ramus which was described in the same case.

Occurrence of excessive unilateral growth in a single bone would seem to rule out systemic factors, particularly hormones, which could be expected to produce bilateral growth. Etiologic con-

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Captain, DC, U.S. Navy, U.S. Naval Hospital.

1. Rushton, M. Unilateral hyperplasia of mandibular condyle. Proc. Roy. Soc. Med. 39:431 May 1946.

2. Worman, H. G.; Waldron, C. E., and Radusch, D. F. Osteoma of mandibular condyle with deviation prognathic deformity. J. Oral Surg. 4:27 Jan. 1946.

sideration has been given to infections of the middle ear[3] and temporomandibular joint, rheumatoid arthritis,[4] hemiplegia,[5] familial inheritance and trauma. Up to the present, however, the etiology is unknown.

■ *Clinical Manifestations*

Certain clinical manifestations of this disease usually are present to a greater or lesser degree, and depend on the extent of hypertrophy of the condyle. Growth of the condyle results in increased vertical height of the ramus and in a lesser increase in distance from the condyle to the gnathion because of the obtuse angle at the gonion.[6] The effect on the occlusion is to produce an open bite on the affected side and a cross-bite on the unaffected side. In advanced cases a mesioclusion also may be present.

In the 29 cases summarized by Rushton,[1] elongation of the ascending ramus was mentioned in only seven cases. In the case to be described herein, there was a 9 mm. elongation of the ascending ramus on the affected side.

In all of the photographs of patients suffering from the disorder, there appears to be a slight increase in the size of the bones of the upper face on the affected side. This is apparent in the case of Adams,[4] described in 1836, which was the first case recorded in the literature; also in cases reported by Rushton,[1] Gottlieb,[7] Thoma,[8] McNichol and Roger,[9] Brown and Petersen,[10] Worman, Waldron and Radusch,[2] and in the case to be presented. In all of these cases the malar eminence seems more prominent and the eye appears to be at a higher level on the affected side.

These observations might lead to a conclusion of hypoplasia of the unaffected side, and were so interpreted by some who saw the patient to be described. It seems more logical to assume, however, that excessive unilateral growth of the affected condyloid process initiated further growth in the adjacent ascending ramus, maxilla and malar bone through functional stimulation and growth of the associated musculature.

■ *Report of Case*

On May 22, 1952, a 20 year old white man was admitted to the sick list at a naval dispensary overseas with a diagnosis of "malunion fracture, mandible." He was transferred to a hospital in the United States for further treatment, and was admitted to the U. S. Naval Hospital in Oakland, Calif., on June 23, 1952.

COMPLAINT AND HISTORY OF PRESENT ILLNESS—The chief complaint of the patient on admission was "earache in left ear and swollen glands in neck." He had had pain in his left ear since November 1951, at which time he had been struck on the jaw while playing football. He had been unaware of facial asymmetry or mal-

3. Gruca, A., and Meisels, E. Asymmetry of mandible from unilateral hypertrophy. Ann. Surg. 83:755 June 1926.

4. Adams, R. Treatise on rheumatic gout, ed. 2. London, J. Churchill, 1873.

5. Heath, C. Hypertrophy of the left ramus of the lower jaw. Trans. Path. Soc. London 34:185 March 6, 1883.

6. Weinmann, J. P., and Sicher, H. Bone and bones, St. Louis, C. V. Mosby Co., 1947, p. 95.

7. Gottlieb, O. Hyperplasia of mandibular condyle. J. Oral Surg. 9:118 April 1951.

8. Thoma, K. H. Oral pathology, ed. 3. St. Louis, C. V. Mosby Co., 1950, p. 967.

9. McNichol, J. W., and Roger, A. T. Original method of correction of hyperplastic asymmetry of mandible. Plast. & Reconst. Surg. 1:288 Nov. 1946.

10. Brown, J. B., and others. Facial asymmetry and malocclusion from hyperplasia of mandible: correction by operation. Plast. & Reconst. Surg. 1:284 Nov. 1946.

occlusion before this injury. Inspection of the patient's medical record, however, revealed an entry in the dental record, "asymmetry of the mandible." This entry was made at the time of his enlistment in July 1950. There were no remarks relative to the occlusion at that time. A second entry by a physician in October 1950 stated "asymmetry of the mandible—shorter on the right." At the time of his football injury the record stated, "indefinite pain and discomfort in the right third molar area. Roentgenographic studies of the mandible were negative for fractures." The patient stated that prior to 1950 his civilian dentist had not remarked about abnormality of his occlusion. He produced an identification picture taken in 1950 in which asymmetry of the face was seen but to a considerably lesser degree than on admission to the hospital. A photograph taken when the patient was 14 years of age showed no evidence of facial asymmetry (Fig. 1, above).

The past history was essentially negative. The patient had not suffered any unusual diseases. He had experienced chronic tonsilitis, but denied ever having had an aural infection.

The patient, who was one of eight siblings, stated that there were no members of his immediate family, nor any relatives known to him, who had developed enlarged or asymmetrical jaws.

CLINICAL FINDINGS—Asymmetry of the patient's face was extremely evident. The center of the chin deviated to the right on closure and returned nearly to the midline in the open position. On the affected side, the face appeared longer, the malar eminence more prominent and the inferior orbital rim at a higher level than on the unaffected side (Fig. 1, center left). On palpation the left condyle was found to be larger than the right condyle. Crepitus was not noticeable in either joint. There was asymmetry of the eyes, the eye being higher on the affected side.

The oral tissues were normal and healthy in appearance, and there were no carious areas present. Examination of the occlusion revealed the teeth to be in crossbite on the right side and slightly open on the left side when the patient was told to close (Fig. 1, below); however, the mandible was seen to drift into a protrusive position as the final movement in closing. When the patient was instructed to close in centric relation, the teeth on the left side were separated approximately 7 mm. as the teeth of the right side were brought into contact (Fig. 1, center right).

Accurate measurements were made, using anesthetic needle insertions, to ascertain the comparative dimensions of the right and left sides of the mandible. The measurements were as follows:

	Right	*Left*
Zygoma to sigmoid notch	9 mm.	25 mm.
Sigmoid notch to lower border of body	44 mm.	53 mm.
Zygoma to lower border of body	53 mm.	78 mm.
Angle to midline	118 mm.	118 mm.

Comparison of the measurements obtained revealed the separation between the sigmoid notch and the zygoma to be 16 mm. greater and the vertical ramus to be 9 mm. longer on the affected side.

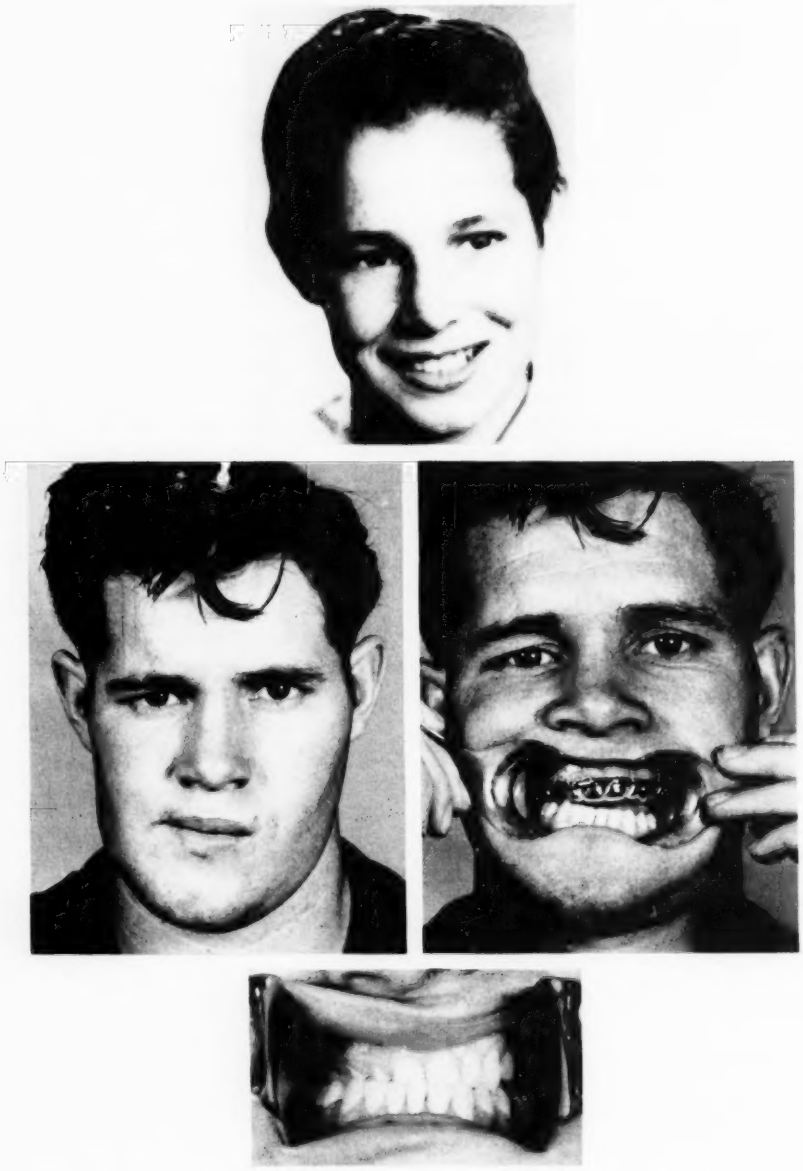


Fig. 1—Above: Patient at 14 years of age, before onset of disease. Center left: Before treatment, showing deviation of chin to right when teeth are closed. Center right: Position of teeth when patient closed jaws in centric relation. Below: Mandible in protrusive bite

The horizontal rami were equal in dimension.

ROENTGENOGRAPHIC FINDINGS — Roentgenograms revealed the left condyloid process of the mandible to be greatly enlarged (Fig. 2, left). Asymmetry of the mandible was striking. Roentgenograms of the condyles in the open and closed positions indicated normal movement of the right condyle and limited movement of the left condyle. There was no evidence of earlier fracture.

PHYSICAL FINDINGS—The patient also was seen by the physicians of the medical service who reported no significant physical defects with the opinion that there was "no evidence of hormonal disturbance."

DIAGNOSIS—A diagnosis of unilateral hyperplasia of the left condyle and vertical ramus was based on typical malocclusion, the roentgenographic appearance of the condyles and the comparative dimensions of the ascending rami on the right and left sides.

Osteogenic sarcoma, which runs a very rapid course with early metastasis to the lungs, was ruled out because of the relatively long history of facial asymmetry

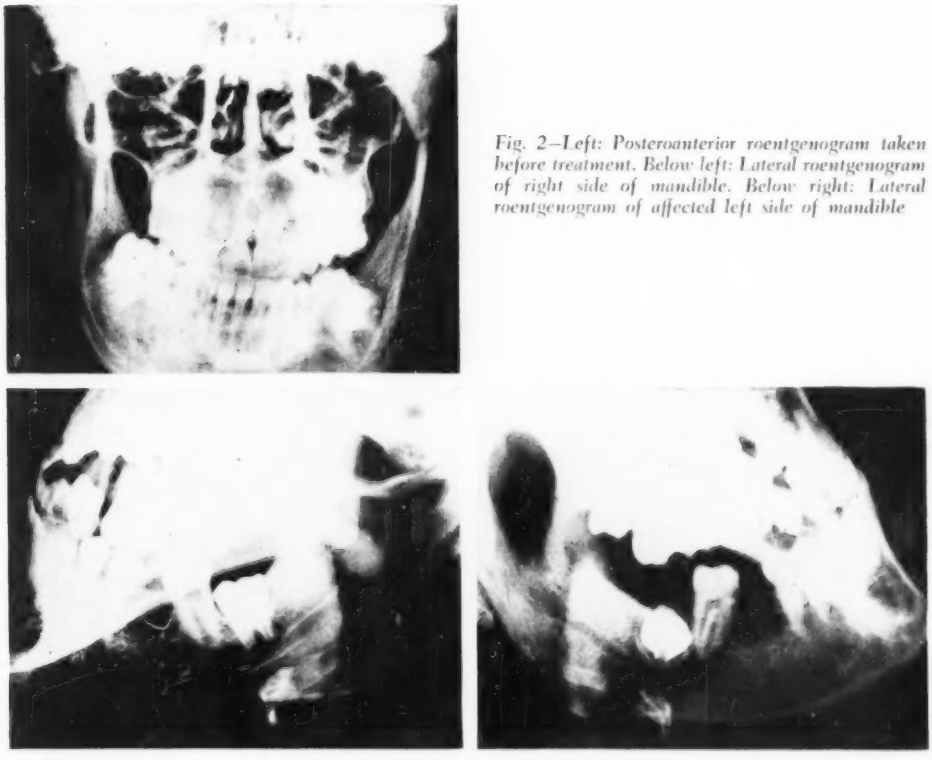


Fig. 2—Left: Posteroanterior roentgenogram taken before treatment. Below left: Lateral roentgenogram of right side of mandible. Below right: Lateral roentgenogram of affected left side of mandible

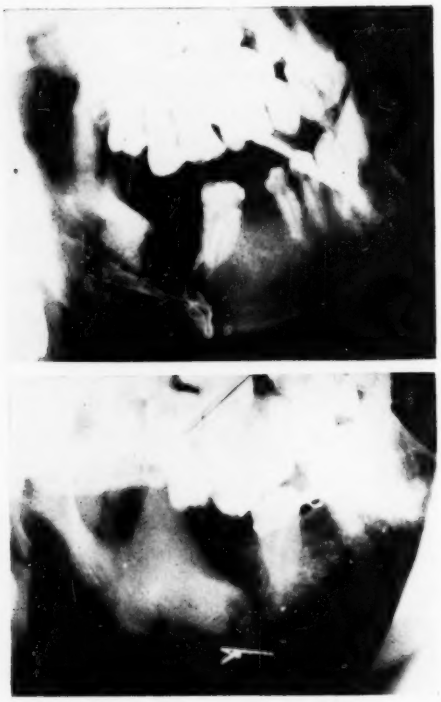


Fig. 3—Above: Roentgenograms taken after removal of impacted third molar and first stage ostectomy. Below: After completion of second stage ostectomy

without evidence of metastatic complication.

TREATMENT—Study models were constructed of the maxillary and mandibular dentitions. It was determined on the articulator that a normal centric relationship was available, except for minor cuspal interference, by shifting the mandible slightly to the left and elevating the left side approximately 7 mm. (Fig. 1, center right). Repeated careful grinding of the patient's teeth, followed each time by new study models, resulted in excellent occlusal interdigitation in the corrected position. Cast gold fracture arch bars were constructed and were accurately fitted to the labial and buccal surfaces of the teeth and wired in place. The patient was given 300,000 units of procaine penicillin twice daily.

On August 29, 1952, under procaine hydrochloride block anesthesia, the left impacted mandibular molar was removed through an intraoral incision, and the mandible was sectioned to the level of the mandibular canal (Fig. 2, below, and 3, above). Postoperative pain and edema were minimal and the patient recovered rapidly.

The second stage of the unilateral ostectomy was accomplished on September 12, 1952. Under thiopental sodium-nitrous oxide-oxygen endotracheal anesthesia, a 4 cm. incision was made below the lower border of the mandible that extended from the angle to the submaxillary notch. The mandible was exposed and sectioned through the previously prepared defect. Ostectomy was limited to the width of the lateral deviation of the mandible in the abnormal centric relation (Fig. 1, center right). The mandibular nerve and vessels were not severed. The mandible was rotated and elevated into normal centric relation and retained with intermaxillary rubber band traction. The body and ramus were joined with two twisted strands of .018 inch stainless steel transosseous wire suture. The lower border of the ramus then extended below the lower border of the body by the same distance that had separated the teeth when in the abnormal centric relation. The masseter and internal pterygoid muscles with the periosteum were ele-

vated from the excess bone, and the strip of bone was removed (Fig. 3, below). The postoperative course was difficult; the patient complained bitterly of pain in the operated region. There was paresthesia present in the left lower lip which probably resulted from surgical trauma, since the mandibular nerve was not severed.

On November 13, 1952, a condylectomy was performed on the affected side.

The lower border of the mandible was exposed through a submandibular incision.[11] The periosteum and masseter muscle, which were detached and elevated, were retracted with the parotid gland and branches of the facial nerve, and the sigmoid notch was exposed. At this point, 4 mg. of decamethonium bromide (C10) (Syncurine) was given intravenously to induce muscle relaxation. The condylar process was sectioned at its base and was excised.

Absorbable gelatin sponge (Gelfoam) was placed in the fossa to assist in controlling hemorrhage and the wound was closed in the usual fashion.

Normal centric occlusion was maintained with intermaxillary elastic traction for three weeks after which the elastics were worn only at night for an additional three week period. A final equilibration grinding was done throughout all of the movements of mastication.

PATHOLOGY REPORT—The pathologist's report was as follows:

Gross Examination—The specimen consisted of a considerably altered condyle of the mandible, 26 mm. long. The articular surface was elongated and slightly roughened. It measured 18 mm. by 19 mm. The margins of the head show roughening and a "moth eaten" appearance on the posterior surface and on the lateral surface (Fig. 4).

Microscopic Examination — Sections showed cortical bone, one surface of which

11. Risdon, F. Ankylosis of temporomandibular joint. J.A.D.A. 21:1933 Nov. 1934.

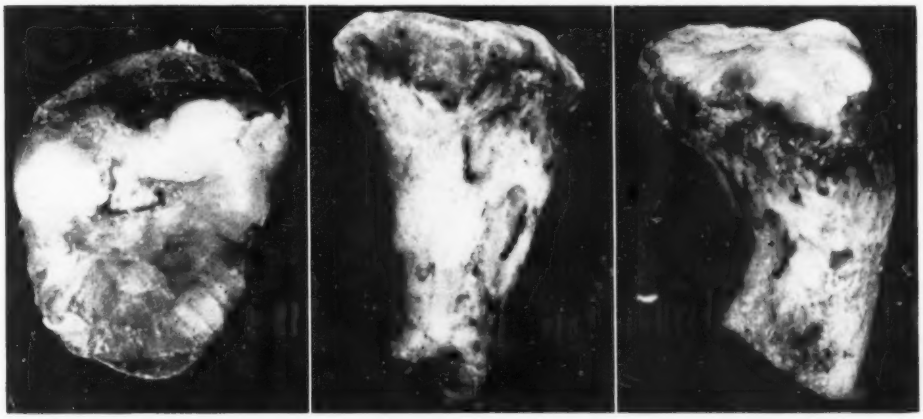
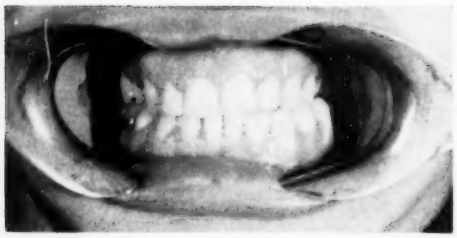


Fig. 4—Affected condyle on left side after condylectomy. Left: Articular surface which measured 18 by 19 mm. Center: Anterior surface. Right: Lateral surface. Condyle measured 26 mm. from articular surface to sigmoid notch



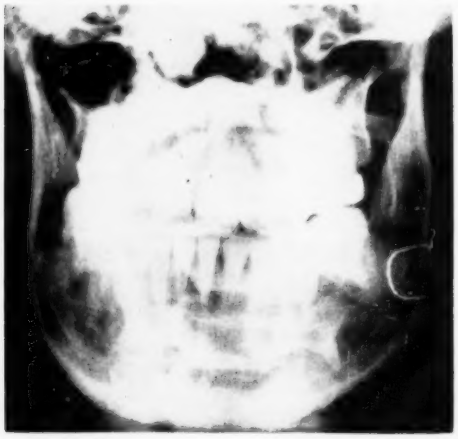


Fig. 5—Left: Occlusion four and a half months after condylectomy. Below left: Roentgenogram taken three months after condylectomy. Below right: Twenty months after condylectomy

was covered by a thin layer of hyaline cartilage with new bone being formed by the process of endochondral bone formation. In one area the cartilaginous plate was partially eroded, and beneath this the bone spicules were undergoing degenerative changes, and the interstices between the bone trabeculae contained necrotic debris. Elsewhere the bone trabeculae were viable, and the marrow spaces contained a mixture of red marrow and fat. There was no evidence of malignancy.

Pathologic diagnosis—Hyperplasia, mandibular condyle.

The patient was discharged from hospital treatment on March 25, 1953. At the time of discharge he was well and had no complaints. Normal centric occlusion was excellently maintained. The teeth on both the right and left sides of the mandible came together evenly and simultaneously (Fig. 5, above). The left lateral excursion was normal while the right lateral excursion was restricted to a few millimeters but was effective in mastication. In the protrusive movement there was slight deviation to the left. Roentgenograms revealed the bone at the site of ostectomy to be healed and the mandible to be symmetrical (Fig. 5, below left). Sensation was returning to the lower lip. The patient was last seen in July 1954 (Fig. 5, below right). Occlusion had been maintained unchanged, and normal sensory response had returned to the lower lip.

■ *Comment*

Unilateral condylar hyperplasia can be treated adequately only by surgical procedures. In the early age groups, orthodontic treatment may supplement the surgical procedures when improvement of the occlusal function is indicated.

The surgical procedures that were used in the treatment of the case herein described were designed to correct a bony deformity while at the same time the normal length of the principal muscles of mastication was maintained.

■ *Summary*

A 20 year old man was sent to the U. S. Naval Hospital, Oakland, Calif., because of unilateral hyperplasia of the condyloid process associated with elongation of the ascending ramus of the mandible. The surgical treatment, which consisted of a unilateral ostectomy of the body of the mandible distal to the last molar tooth, followed by condylectomy, resulted in excellent correction of prognathic facial asymmetry and improved masticatory function.

A modification of sialographic technic

■ *John G. Whinery, D.D.S., Amarillo, Texas*

A new and simple modification of the technic of obtaining sialograms has been developed which not only facilitates the taking of a sialogram but makes possible a more detailed roentgenographic picture of the gland.

The history of the development of sialography, and the indications for its use have been described well by Schroff.[1] It will suffice for this paper to say that sialograms may reveal: (1) normal gland anatomy; (2) orderly displacement or distortion of ducts caused by benign tumors; (3) irregular filling of the gland caused by invasive tumors, and (4) various degrees of puddling that result from inflammatory degeneration of the gland. Sialograms are not indicated when an intraglandular or intraductal calculus or concrement is present. The injection of the fluid not only might displace the concrement posteriorly, but the radiopacity of the fluid would hide the stone.

■ *Modification of Technic*

The duct is ligated securely around the cannula with a silk suture (Fig. 1). The mucosa in the region of the duct is anesthetized first, and the gland is milked of excess saliva. As large a cannula as pos-

1. Schroff, Joseph. Diseases of the salivary glands; sialography: its application in the study and treatment of salivary gland conditions. J.A.D.A. 26:861 June 1939.

sible is passed approximately 1.5 cm. into the duct. It may be necessary to dilate the duct aperture with probes in order to admit a cannula. Very rarely is it found to be necessary to slit the duct to insert a cannula.

A no. 0000 silk double suture is passed through the mucosa to encircle the cannulated duct. This suture is tied securely and the ends either are taped to the syringe or are held by the assistant in order to prevent the accidental withdrawal of the cannula.

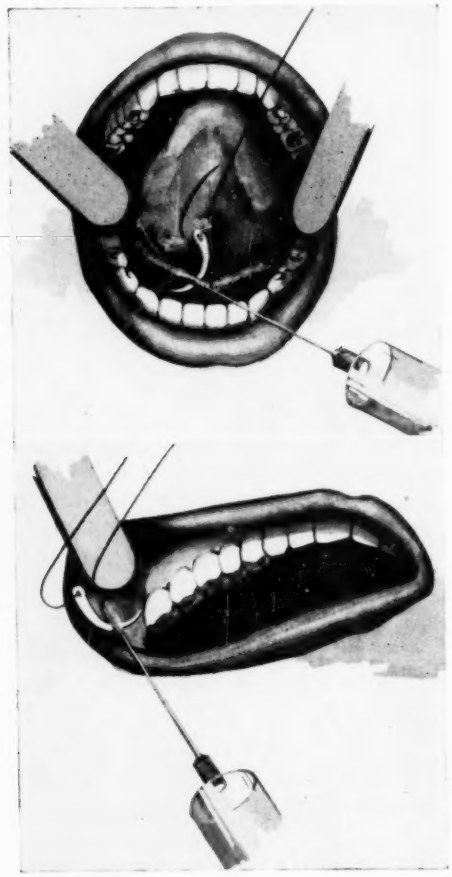


Fig. 1—Technic of drawing duct tightly around cannula with suture

The radiopaque fluid is injected slowly until pain is felt by the patient. From that point, 0.5 to 1 cc. of additional fluid is injected slowly without causing undue distress to the patient. The roentgenograms are exposed and developed while the syringe and cannula are held in place by the assistant. In this way, if another view of the gland is desired, it can be obtained easily. Finally, the cannula is withdrawn and the suture is cut. The same technic may be used for either the parotid or submaxillary glands.

■ *Discussion*

Regurgitation and spillage of radiopaque fluid from the duct into the mouth is avoided by drawing the duct tightly to the cannula. If this is done, the roentgenograms will be free from the complicating radiopacity that is caused by accumulation of the radiopaque fluid on the floor of the mouth or on the tongue and cheek.

Occasionally only an extremely small cannula can be passed into the duct. If the duct is considerably larger than the cannula, however, very little pressure can be developed, and complete filling of the gland is not possible. It was an experience with one such case that prompted the development of the suture modification herein described.

When the gland is completely filled, it shows a generalized increase in density, and the exact limits of the gland become distinct (Fig. 2). The filling of the glandular acini with the radiopaque dye has been referred to as the sialo-acinar reflux

by Samuel,[2] who stated that he felt this occasional finding to be a fault in technic. I do not believe that this is a fault but an asset, since it facilitates more complete showing of the gland anatomy as well as any pathologic condition which is present.

If the suture technic is used in sialography, a more even pressure can be obtained in each case and this will result in more uniform sialograms. The interpretation of sialo-acinar reflux as evidence of intraglandular inflammatory degeneration does not appear to be justified. The multiple goblet formation commonly seen indicates early cystic degeneration of the gland. A further discussion of the interpretation of sialograms is not within the scope of this paper, however. In 1948 Weisberger and Schulz[3] presented an excellent discussion of the interpretation of sialograms, correlated with clinical findings.

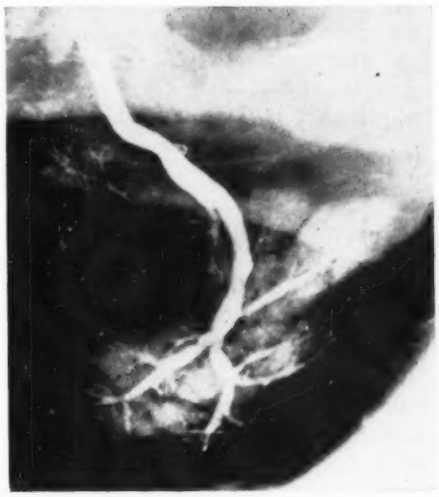


Fig. 2—Sialogram taken by the suture technic

■ *Summary*

A modification of the technic of taking sialograms has been developed which makes possible a more detailed roentgenographic picture of the glands. It is felt that the interpretation of the sialo-acinar reflux as a fault in technic is incorrect, since the sialo-acinar reflux makes possible a more complete study of the gland.—*Fisk M and P Building.*

2. Samuel, Eric. Sialo-acinar reflux in sialography. Brit. J. Radiol. 23:157 March 1950.

3. Weisberger, D., and Schulz, M.D. Sialography: its value in the diagnosis of swellings about the salivary glands. Oral Surg., Oral Med. & Oral Path. 1:233 March 1948.

■ The Benefits of Words

Words, like deeds, may be constructive or destructive, elements of strength or expressions of decay. Those who learn to speak with charm, precision, vigor, and good diction, soon experience the benefits of well-used words.—*William G. Niederland, Man-Made Plague: A Primer on Neurosis.*

Laryngospasm in oral surgery

■ *Adrian O. Hubbell, D.D.S., Fort Lewis, Wash.*

Laryngospasm is a minor complication of intravenous anesthesia about which there is much misinformation, uncertainty and fear. In laryngospasm the vocal cords are adducted to some degree so that they cause partial or complete obstruction of the airway. This is an infrequent complication when the anesthesia and surgery are skillfully managed. When laryngospasms do occur, they need not be dangerous or alarming if properly treated. The constant discussion of this minor complication by oral surgeons and hospital operating room personnel suggests that this problem is frequently mismanaged.

There are several characteristics of oral surgery performed under general anesthesia which demand exceptional skill and teamwork. Anesthesia must be managed with the patient's mouth open. Capillary oozing prevents a dry field of operation; mouth packs are required to protect the airway. Light anesthesia and early ambulation are desirable. A higher incidence of laryngospasm may be expected in oral surgery than in other types of surgery. The oral surgery-anesthesia team must be properly equipped and trained for maintenance of the airway and treatment of laryngospasm.

Complete anesthesia equipment and supplies should be available. This should include a nasal mask, suction apparatus (minimum 20 inches of vacuum), a tonsil suction tip, a headlight, a laryngoscope and succinylcholine chloride.

Most important are two trained assistants. The operator and his two assistants must function as a team to perform the necessary procedures without excitement or wasted time and effort. The surgeon as well as the other members of the surgery-anesthesia team should be aware of the airway at all times. Any impairment should be corrected immediately. As Krogh[1] has aptly stated, treatment should start with the first incomplete respiration.

■ *Etiology*

Spasms may be caused by one or more exciting factors. Light intravenous anesthesia, as used for oral surgery, does not reduce the normal protective irritability of the larynx. A minute drop of mucus in contact with the cords may cause a spasm. Painful stimulation during light anesthesia is believed to be another cause of spasms; however, this is an infrequent cause. Sudden changes in the character of respiration in response to pain may stimulate the larynx to spasm. Partial obstructions in combination with

The technics described in this article are based on experiences and observations of the author in private practice prior to active duty with the U. S. Army.

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1. Krogh, H. W. Use of thiopental sodium in dental surgery. J. Oral Surg. 5:337 Oct. 1947.

hypoxia tend to produce spasms. Partial spasms, inadequately treated, with continuing hypoxia become complete spasms.

■ *Prevention*

There are several practices which are useful in the prevention of spasms. Efficient packing of the posterior part of the mouth and careful aspiration of blood and mucus during surgery avoid unnecessary irritation of the larynx. The problem of protecting the pharynx from blood is simplified if the patient is placed in an upright sitting position with the occlusal plane horizontal. This position is awkward and tiring for the surgeon, and its advantages are relative to the experience and skill of the surgery-anesthesia team. Skillful packing of the mouth and aspiration during surgery will allow the surgeon to work in the position of his choice. If an operating table is used, a position slightly approaching the Trendelenburg position may be of advantage in protecting the larynx from blood.

Atropine decreases secretions; effective doses are recommended for longer procedures. The administration of atropine intravenously five minutes prior to induction with thiopental sodium (Pentothal) is recommended. The short wait can be made pleasant for the patient by giving 2 cc. of Pentothal (50 mg.) before the atropine.

Spasms occur more frequently when slow inductions of Pentothal are given by drop or by small repeated fractional doses. Since only the lightest anesthesia is needed for this work, complete and rapid induction to the light level required for the start of the operation is desirable.

Spasms may be prevented by anesthetizing the larynx before induction. This procedure is time-consuming and unpleasant. A more serious disadvantage for oral surgery is the loss of the protective sensitivity of the larynx. For the treatment of an existing spasm, such methods are difficult to accomplish and too slow if anoxia is to be avoided.

■ *Treatment*

The common practice of inserting an oropharyngeal airway, placing a full-face mask and attempting to force oxygen into the lungs is frequently ineffective. Oxygen under pressure appears to force the cords more tightly together and prevents inflation of the lungs, even though air can be expelled readily from the lungs by compression of the rib cage. The oropharyngeal airway elevates the base of the tongue but does not improve the position of the vocal cords. The full-face mask prevents access to the mouth for necessary aspiration and control of bleeding wounds.

Often the patient is flaccid from anoxia before the lungs can be ventilated by the use of a full-face mask and oxygen under pressure. It is not a suitable method of treatment.

When laryngospasm occurs, the pharynx should be examined at once for foreign material with a headlight and an aspirator. The mandible should be held well forward in a protrusive position and the tongue firmly extended. This procedure elevates the epiglottis and tends to open the glottis. For all but extremely tight spasms, this procedure will allow a crowing inspiration, which is usually adequate to prevent hypoxia if oxygen is supplied to the laryngopharynx by way of the

nasal mask or nasopharyngeal tube. In moderately tight spasms, it is helpful to apply light alternate compression to the lower rib cage and thus increase the tidal exchange of oxygen. Most spasms are partial to a degree that this treatment is all that is necessary until the spasm relaxes. This method of treatment has become effective routine procedure in many oral surgery offices.

If no respiratory exchange is readily obtained with the chin forward and tongue extended, then complete spasm exists. It is difficult to obtain an adequate airway in patients with partial laryngospasms if they are obese or if they have trismus, a receded chin or ankylosis of the cervical vertebrae. Usually when such patients are in spasm, they must be treated as though in complete spasm.

The examination of the throat and evaluation of the spasm should require no more than 20 seconds.

If the spasm is complete or if the respiratory exchange is inadequate to prevent hypoxia, the spasm should be relaxed with succinylcholine chloride. Ten to 20 mg. of succinylcholine chloride should be given intravenously in a vein other than the one used for Pentothal. If another vein is not readily accessible, the needle employed for Pentothal may be used. Slightly more drug may be required as the anesthetic solution partially neutralizes the succinylcholine chloride. Bullard[2] has found that only 10 mg. is required to relax most spasms. The effect is immediate; relaxation occurs in about ten seconds.

Occasionally a second dose is required, as the spasm may recur after three to five minutes when the effects of the initial dose of succinylcholine chloride have worn off. Artificial respiration is usually required for two to three minutes after an effective dose of succinylcholine chloride.

When the patient is in the dental chair, this procedure is very simply performed by alternate compression of the lower rib cage by the surgeon's right hand and forearm. The semireclining position of the patient increases the effectiveness of this method of artificial respiration because the abdominal viscera cause a downward tension on the diaphram rather than a pressure against the diaphram as in the supine position. Manual methods produce excellent results in light anesthesia because the elasticity of the rib cage is relatively great. The tongue should be kept well forward and the mandible supported.

It is obvious that the necessary treatment to be rendered at one time requires a team of three people. If the operating table is used, a team of four is better, since one person will be required to support the head and chin. When the patient is in the dental chair, one hand is sufficient to support the head and chin.

When an oral surgeon and two assistants are working at the dental chair, the doctor stands at the right side of the chair. The aspirator nurse, standing on the left side of the chair, supports the patient's chin with her right hand and uses the small aspirator tip with her left hand. The instrument nurse stands in front of and to the right of the chair (Fig. 1).

When a laryngospasm occurs, each

2. Bullard, O. K. Personal communication.

person on the team has duties which must be performed in the proper order.

The aspirator nurse (1) hands the aspirator to the instrument nurse, (2) adjusts the nasal inhaler over the patient's nose, (3) tightens the exhaling valve and adjusts the gas machine to deliver oxygen to the pharynx with force (Fig. 2) and (4) maintains the nasal mask tightly with the right hand and resumes support of the patient's chin with the left hand (Fig. 3).

The instrument nurse (1) places a gauze square on the patient's chest for the surgeon to use in grasping the tongue and (2) changes the small suction tip for the large tonsil tip (Fig. 2).

The surgeon (1) relieves the aspirator nurse by supporting the patient's chin with his left hand, (2) places the throat pack or packs over the bleeding regions and exposes the oropharynx (Fig. 2), (3) uses the gauze square between thumb and forefinger to grasp and extend the tongue, (4) takes the aspirator tip from the instrument nurse and examines and aspirates the pharynx (Fig. 3) and (5) listens for breath sounds at the mouth (Fig. 4). If a crowing inspiration is present but inadequate, he may increase the exchange by alternate compression of the lower rib cage with the right hand and forearm across the patient's chest.

In more than 95 per cent of the cases of spasm, the procedure just described provides an airway which is adequate to prevent hypoxia.

If the airway is inadequate or if the spasm is complete, the following additional measures are employed:

1. The instrument nurse aspirates 30 mg. of succinylcholine chloride into a syringe to which an intravenous needle is attached.

2. The surgeon places a tourniquet and injects 20 mg. of the succinylcholine chloride intravenously (Fig. 5). The syringe is attached to the arm with tape, and the needle is left in place.

3. The surgeon then again holds the tongue with his left hand.

4. When the spasm relaxes, in approximately 10 seconds, the surgeon with his right hand and forearm across the patient's chest (Fig. 6) gives artificial respiration.

Doses of succinylcholine chloride which are sufficient to relax laryngospasms do not always cause apnea; however, artificial respiration is recommended to insure adequate exchange. When spontaneous respiration is adequate, usually in 1 to 3 minutes, the operation is resumed. Occasionally an additional 10 mg. of succinylcholine chloride may be required to relax a spasm, or a spasm may recur in three to five minutes and require an additional dose.

The treatment as outlined can be given in approximately one minute.

■ *Discussion*

The intravenous barbiturates provide a smooth, pleasant induction and obviate the need for preanesthetic hypnosis with long-acting central nervous system depressants. Preoperative sedation is occasionally needed for unusually apprehensive patients. Morphine and sodium pentobarbital, used as premedicants, reduce respiratory effort and therefore complicate the management of spasms. These drugs reduce the metabolic rate, slow the metab-

Fig. 1—Positions of members of operating team. A, aspirator nurse; B, instrument nurse; C, surgeon

Fig. 2—Instrument nurse removes small suction tip and attaches tonsil tip. Aspirator nurse tightens exhaling valve and adjusts gas machine to deliver oxygen to pharynx with force. Surgeon places packs over bleeding regions and supports patient's chin

Fig. 3—With aspirator, surgeon examines pharynx for foreign material

Fig. 4—Surgeon extends patient's tongue and listens to determine sufficiency or lack of respiratory exchange

Fig. 5—Surgeon injects 20 mg. of succinylcholine chloride when the spasm is found to be complete (very rare)

Fig. 6—After relaxation of complete spasm with succinylcholine chloride, surgeon maintains controlled respiration with right hand and arm until normal respiration is adequate

olism of intravenous barbiturates, and prolong the recovery period even though less intravenous drug may be required.

Endotracheal intubation is frequently suggested as a treatment for spasms. The laryngoscope is difficult to use on an unrelaxed patient, and intubation cannot be accomplished safely if the cords are in spasm. Attempts to intubate by force may result in injury to laryngeal structures. If a spasm is sufficiently relaxed to permit intubation, the need for intubation no longer exists. When a spasm is relaxed, hypoxia can be relieved quickly by artificial respiration with oxygen and a patent airway.

If a laryngospasm is not controlled until the patient is flaccid from anoxia, intubation may speed the ventilation of the lungs. If bleeding or manipulations interfere with maintenance of a normal airway, intubation is the most practical approach to the trachea for the aspiration of excessive tracheobronchial secretions. It is a most valuable aid in the maintenance of prolonged controlled respiration.

When an inexperienced surgeon attempts to perform oral surgery under general anesthesia with the aid of even the most skillful anesthesiologist, he must expect dangerous airway complications unless endotracheal intubation is employed. The dentist should not expect the anesthesiologist to do unaided what ideally is done by a team of three people, all experienced in the special technics of general anesthesia. Intubation is not justified for most oral surgical procedures which require only a few minutes of anesthesia maintained at a very light plane. Even the shortest anesthesia justifies intubation, however, if the surgery must be done by a surgeon and assistants who are inexperienced in general anesthesia technics for oral surgery.

■ *Summary*

Laryngospasms are not dangerous or alarming if properly treated. Spasms can be corrected with certainty in approximately one minute. For the detailed technic required to manage a spasm, coordinated teamwork of the surgeon-anesthetist and two assistants is of prime importance.

■ Acquisition of Knowledge

Knowledge is acquired by a compelling force from within, by desire, or from without, by compulsion. —*C. H. Mayo, "The Trained Nurse," Collected Papers of the Mayo Clinic & Mayo Foundation 13:1242, 1921.*

Early management of maxillofacial war injuries

■ *Bruno W. Kwapis, D.D.S., M.S., St. Louis*

Technics used in the early management of approximately 200 maxillofacial injuries at an evacuation hospital in Korea were analyzed to determine the factors responsible for the improved treatment of casualties in this military campaign.[1] The primary factor was a rapid, well-functioning evacuation system which made it possible for severely wounded men to be on the operating table in a matter of hours after injury. Unlimited supplies of the wide-spectrum antibiotics and whole blood permitted primary treatment of wounds equal to that of most general hospitals.

Not least in importance was the presence of competent medical personnel in the combat zone. The placement of qualified oral surgeons at forward medical installations, such as the mobile surgical and evacuation hospitals, resulted in definitive treatment of the maxillofacial injuries at the initial operation.

These factors were responsible for new concepts in maxillofacial tissue management, concepts which were derived from proved surgical principles. A sound regime in the initial care of these patients decreased the need for reconstructive surgery.

■ *Respiratory Embarrassment*

Obstruction of the vital respiratory passages contained within the maxillofacial region is rapidly fatal. Tracheotomy is a life-saving procedure, the judicious use of which proved most important in maintaining a mortality rate of zero for this class of injury. Because care of a tracheotomized patient is tedious, requiring additional facilities and personnel, there has been criticism of the frequency with which tracheotomy has been performed and likewise of the frequency with which it has been considered as indicated. Since respiratory embarrassment may cause death within minutes, any indication of the need for a tracheotomy is adequate reason for performing one.[2] The tracheotomy proved to be an integral part of a sound regime for several types of injuries.

In the extensively avulsed or comminuted fractures of the symphysis region of the mandible, respiratory difficulty is quickly apparent. The supporting musculature of the tongue and of the floor of the mouth is attached to the inner inferior aspect of the symphysis of the mandible. Loss of this osseous support is followed by collapse of these structures (Fig. 1). Since most patients lie on their

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1. Chipps, J. E.; Canham, R. G., and Makel, H. P. Intermediate treatment of maxillofacial injuries. U. S. Armed Forces M. J. 4:951 July 1953.

2. Management of battle casualties. Department of the Army Technical Bulletin, TB Med. 147:7 June 1951.

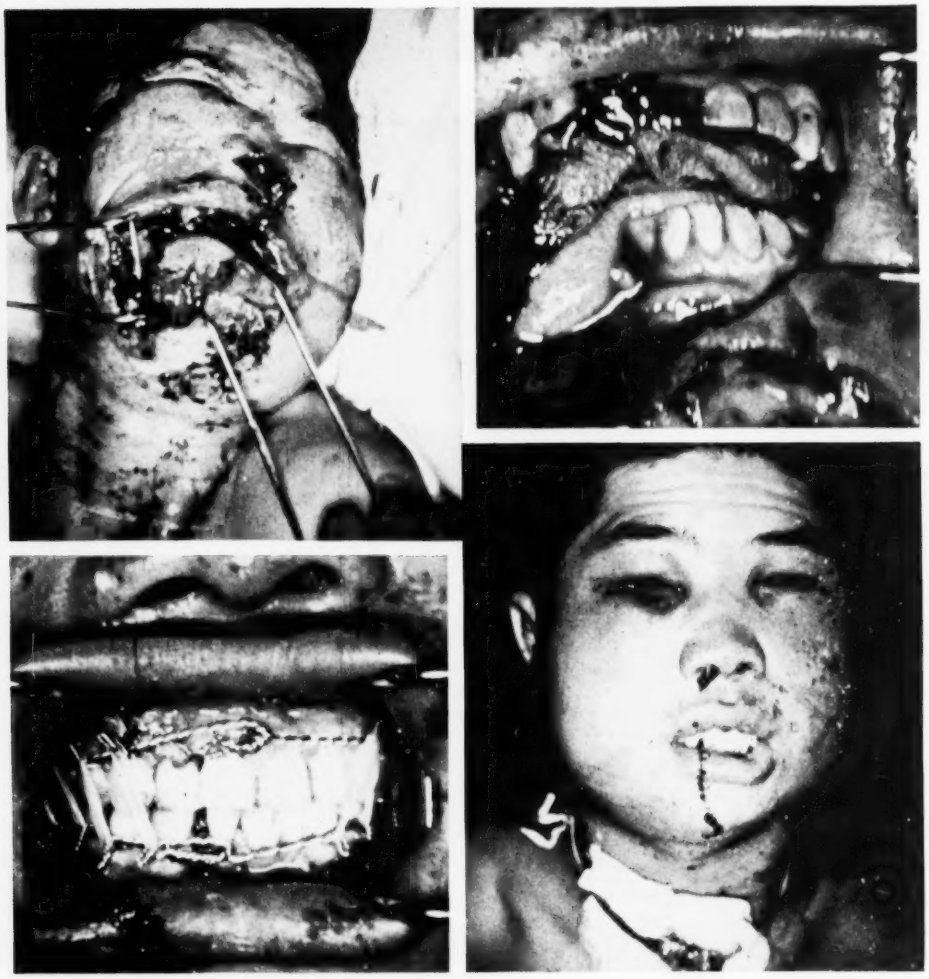


Fig. 1—Above left: Fracture of facial bones and laceration of lower lip and floor of mouth, resulting from tank accident. Complete disarticulation of right mandibular fragment with 5 cm. displacement. Above right: Intraoral view of displacement of fractured mandible and maxilla, oral lacerations and extensive hemorrhage. Below left: Intraoral view showing restoration of occlusion and immobilization of jaws by interdental wiring with intermaxillary elastic traction for fixation. Below right: Photo taken on fifth postoperative day showing primary repair of facial laceration and position of nasal packs after bilateral antrotomies. Tracheotomy performed prior to anesthesia and surgery

back when they are injured, these structures retract against the posterior pharyngeal wall and occlude the air passage. This situation may be further complicated by hemorrhage and varying degrees of unconsciousness. An injured patient

lying on his abdomen may have adequate inspiration.

Tracheotomy is indicated also for the patient with deep penetration wounds extending into the floor of the mouth and the base of the tongue. Hematoma of this extremely vascular region can produce respiratory difficulty without evidence of gross external injury.

Respiratory embarrassment caused by edema, especially postoperatively, has been observed in several patients operated on at the forward hospitals and evacuated through 121st Evacuation Hospital.

The standard technic for tracheotomies in this theater was the median longitudinal incision usually performed under local infiltration anesthesia. The incision should be carried boldly down to the trachea. In circumstances that permit an orderly procedure, dissection from the skin to the trachea should be blunt and sharp, all bleeding vessels being caught and ligated.

The trachea should be exposed from the first tracheal ring inferiorly. A circular section, approximately the diameter of the tracheotomy tube, is removed from the anterior tracheal wall at about the level of the second tracheal ring, and a tracheal cannula of corresponding size is inserted. The cutaneous incision may then be sutured and the cannula stabilized to the neck by cords or tape (Fig. 1, below right).

■ *Control of Hemorrhage*

Control of hemorrhage was not ordinarily a major problem. The searing action of a missile as it penetrates tissue occludes the small and most of the larger vessels. In several instances the external maxillary artery was observed to be completely severed but not bleeding. Large bleeding vessels should be clamped with a hemostat and ligated. Regions of lesser capillary oozing were best managed by application of sterile gauze pressure dressings. This treatment was adequate hemostasis also for exposed fractured facial bones.

In two cases where hemorrhage originated from deep posterior maxillary cavities, ligation of the external carotid artery was attempted. This procedure was not completely successful probably because of collateral circulation. Such uncontrollable hemorrhage was best treated by the insertion of an absorbable gelatin sponge (Gelfoam) into the wound with pressure and then a tight gauze packing. This packing was retained for several days or until the gauze could be withdrawn without recurrent hemorrhage. This procedure was not applicable to hemorrhage from soft tissue wounds.

■ *Treatment of Shock*

Most of the patients with severe maxillofacial injuries were in various stages of shock, primarily caused by loss of blood. Emphasis was placed on restoration of the blood volume and the hemoglobin level, the latter being important for prolonged general anesthesia. The best substitute for lost blood is whole blood. Whole blood was always available and was used routinely for patients in shock after loss of blood. Surgery was performed as soon as the blood pressure and pulse became stabilized at a desirable level.

■ *Anesthesia*

General anesthesia was employed in 95 per cent of the cases. Endotracheal in-

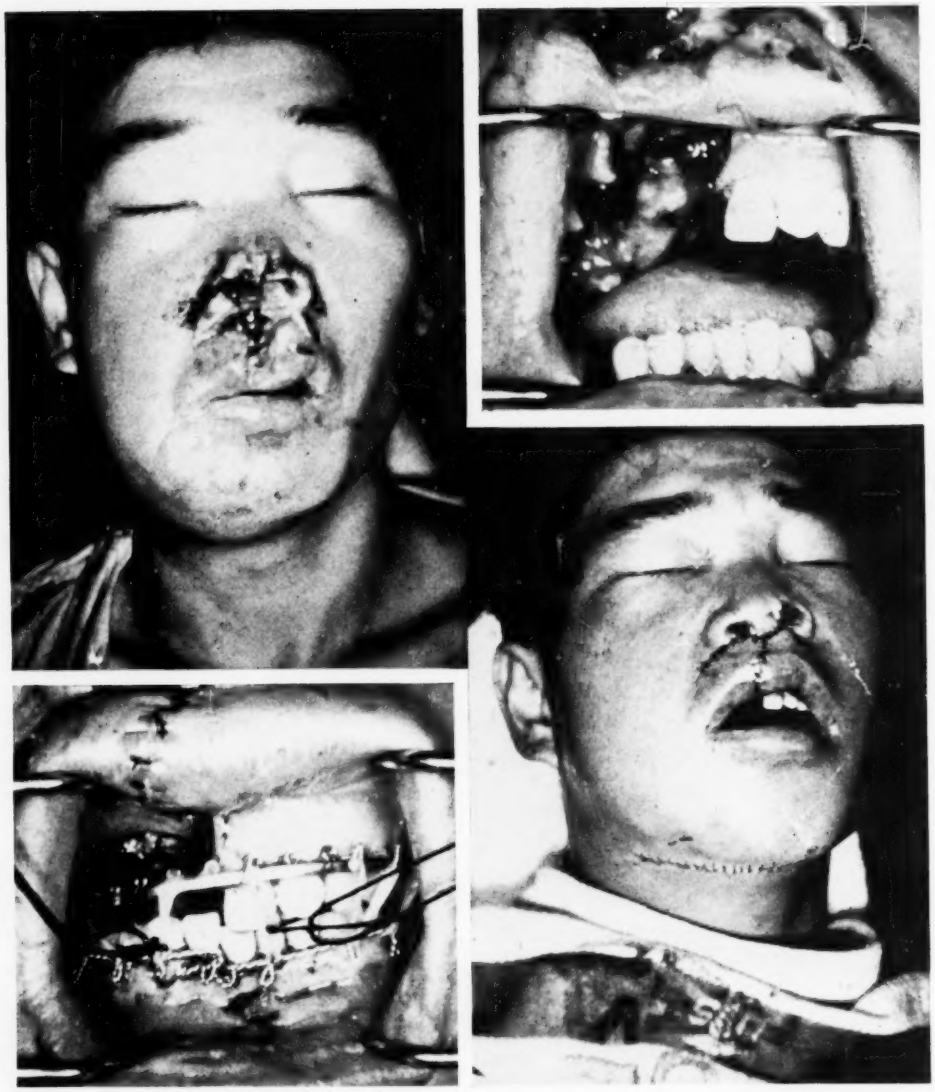


Fig. 2—Above left: Penetrating wound of nose, upper lip and right side of maxilla with fracture of body of mandible on right side. Above right: Oral view showing avulsion of teeth and portion of maxilla. Below left: Intraoral view showing reduction of fractured maxilla and mandible by use of maxillary arch bar and mandibular interdental wiring. Immobilization accomplished by intermaxillary elastic traction. Rip cords applied. Below right: Primary plastic closure of nasolabial wound after débridement. Note position of closed incision for open reduction of fractured mandible

tubation was the only acceptable means of maintaining a patient with facial injury under general anesthesia for prolonged periods of time. Either nasal or oral intubation was performed on all patients after induction with thiopental sodium (Sodium Pentothal). The absence of intraoral surgery permitted oral intubation.

Premedication, administered intravenously, consisted of 50 to 75 mg. of meperidine (Demerol) and 1/150 grain of scopolamine. This small amount of meperidine was considered adequate, since many of the patients had already received opiates at forward medical installations. Patients receiving medication in this manner were given a general anesthetic immediately; for the other patients there was a half hour delay.

The larynx was anesthetized topically by a transtracheal injection of 4 per cent cocaine solution prior to actual induction. This injection reduced laryngospasm in patients susceptible to it because of blood and debris. Anesthesia via the opening in the trachea was employed for patients arriving at the hospital with such an airway. For patients with extensive facial injuries, a tracheotomy was necessary to facilitate general anesthesia and to permit an unobstructed operative field. Nitrous oxide and oxygen, occasionally supplemented with ether, was the anesthetic agent used. This proved adequate even for the longest operation, which required eight hours of surgery.

■ *Missile Wounds*

The large number of wounds observed provided an opportunity to analyze the destructive effect of missiles on the tissues of the maxillofacial region. The following, in order of greatest frequency, were the responsible agents in this group of casualties: shell fragments, mortar fragments, grenade fragments, bullets, land mines. One wound was caused by flak, none by aerial bombs.

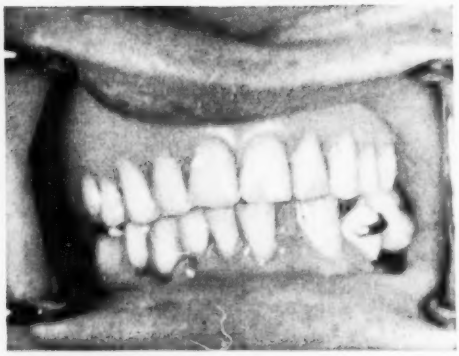
TYPES OF WOUNDS—For convenience of description the wounds resulting from these missiles are grouped into three distinct types; namely, penetrating, perforating and avulsive wounds.

The penetrating wound is one in which the missile passes through the skin and lodges within the facial structures (Fig. 2). In this type, the velocity of the missile is usually decreased or "spent," and a foreign body or missile is always seen in the roentgenogram.

The perforating wound is one in which the missile enters the tissue and produces a demonstrable exit (Fig. 3). In this situation the velocity of the missile is much greater than that of the missile producing the penetrating wounds, and the wound of exit is larger than that of entry. The primary missile is usually not seen in the roentgenogram.

The avulsive wound is one in which there is an obvious tearing away of tissue (Fig. 4). The size and velocity of the missile causing this type of wound are usually great. The penetrating wound is seldom avulsive. At the point of exit, the perforating wound can be extremely avulsive. Because of frequent loss of soft and osseous tissue, wounds of this type are difficult to repair.

A missile as it enters tissue is referred to as a primary missile. When it strikes a solid mass such as teeth or bone, a shatter-



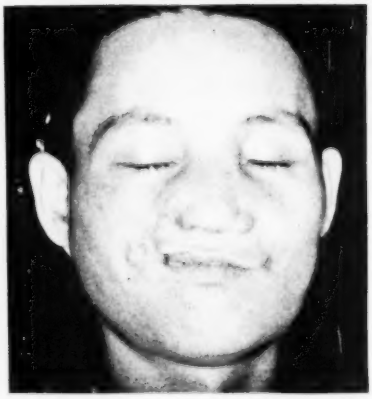


Fig. 3—Above left: Injury caused by shell fragment. Missile entered left cheek in preauricular region. Large avulsed wound is that of exit of missile. Complete loss of hard palate and anterior portion of maxilla. Above right: Photo taken on second postoperative day, showing appearance after débridement and primary closure of wound. Bilateral nasoantral packs in position. Tracheotomy to facilitate general anesthesia and surgery. Center left: Photo taken on fifth postsurgical day, showing repaired palate. Repair accomplished by dissecting buccal mucosal flaps and suturing them to available surrounding tissues. Center right: Maxillary and mandibular prosthesis constructed for patient five weeks after initial injury and surgery. Below: Patient five weeks after surgical treatment. Mild distortion of right corner of mouth

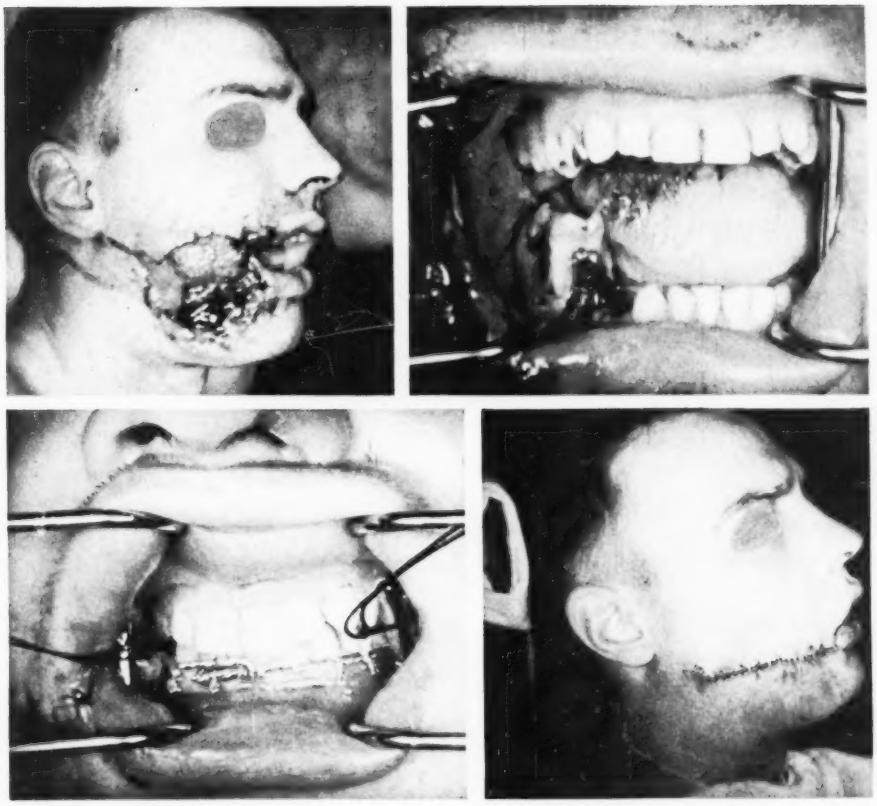


Fig. 4—Above left: Avulsive wound of right cheek with skin loss, caused by shell fragment. Above right: Intraoral view, showing displacement of fractured mandible and injury to corner of mouth. Below left: Postoperative intraoral view, showing repair of corner of mouth and reduction of fractured mandible by interdental wiring and intermaxillary elastic traction for fixation. Rip cords applied. Below right: Photo taken on fourth postoperative day, showing wound after primary closure, which followed débridement and extensive undermining of skin in submaxillary region

ing of these structures occurs, resembling an explosion. If the momentum of the primary missile is great enough, it will propel these bone and tooth fragments in the form of secondary missiles. Thus, a small primary missile can produce unbelievable tissue destruction and frequently forces secondary missiles into other portions of the facial anatomy. Such foreign bodies have been extricated from the nose, pharynx, tongue and other adjacent organs. Whenever teeth are fractured by a missile and the tooth substance cannot be accounted for, the surrounding oral tissues should be inspected carefully.

DEBRIDEMENT OF WOUNDS—The passage of a missile through tissue produces a

tract with a devitalized central zone. The necrotic tissue in such a zone provides an excellent medium for the propagation of the bacterial contaminants. Consequently, all wounds caused by missiles require débridement, a procedure consisting of excision of nonviable tissue, extirpation of the foreign body and cleansing of the wound (Fig. 5).

An important part of this regime is irrigation of the wound with normal saline solution to remove clotted blood, dirt and debris and to permit accurate observation and inspection of the wound. The amount of normal saline solution used varied from 500 to 1,000 cc.

Although many wounds of this type were compounded into the oral cavity and the antrums, postoperative infection was made minimal by careful débridement, the proper use of drains and the controlled administration of adequate antibiotics. Penicillin, either alone or combined with streptomycin was used, since these two antibiotics are effective against a wide spectrum of bacteria.[3]

A large percentage of these wounds were composite ones, involving not only skin, mucosa, oral cavity and antrums but also bone fractures which necessitated reduction and immobilization (Fig. 6, 7). To perform this complex treatment, a routine was established. Eye injuries had precedence in treatment and were cared for by the ophthalmologist.

If involved, the maxillary sinus was treated prior to other portions of the maxillofacial region with the exception of the eyes. When the penetrating missile was large, it had made a large opening into the antrum, which permitted removal of the foreign body and débridement without further surgical exposure (Fig. 7). If no such accessible opening existed, a Caldwell-Luc approach was used to enter the maxillary sinus for débridement.

Although the attitude was conservative, that is, that bone should be preserved if possible, the naturally thin wall of the antrum and extensive comminution with detachment of fragments prohibited salvage and restoration. In such cases a nasal antral window was made to facilitate removal of the gauze pack. This procedure permitted cutaneous and intraoral closure of the antrum.

Of the 200 patients with maxillofacial injuries, about 30 sustained associated palatal injuries. The soft palate was far less frequently involved than the hard palate. Injuries to the palate ranged from simple perforations to complete avulsion. Since the importance of an intact palate in normal deglutition and speech was fully appreciated, a great effort was made to effect a primary closure. The uncomplicated perforation of the palate was closed by undermining adjacent mucosa and suturing for approximation. If closure of the palate was not feasible by this method, flaps dissected from the buccal mucosa were employed for this purpose. With this source of tissue it was possible to close palatal defects.

Suturing of the palatal mucosa, as of all other oral mucous membrane, was performed by application of the multiple-interrupted-suture technic and the use of black silk. Since early breakdown of wounds closed with catgut had been observed, use of absorbable suture material

3. Antibiotic therapy. Department of the Army Technical Bulletin, TB Med. 9:5 June 1951.

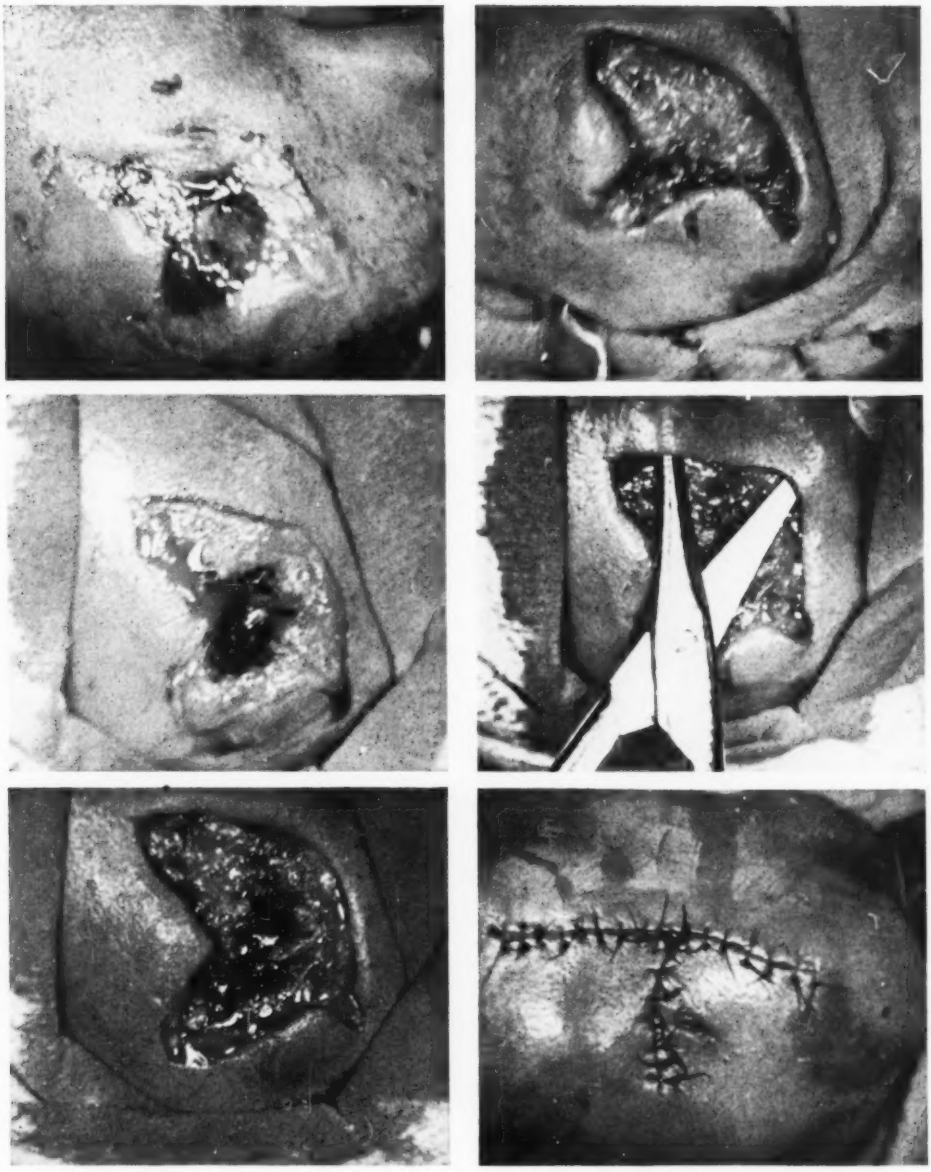


Fig. 5—Steps in débridement and closure of missile wound. Left above: Missile wound of right side of face, caused by penetrating shell fragment. Fracture of mandible was associated with this wound. Left center: Incision around periphery of wound after irrigation and débridement of fracture. Left below: Wound after excision of nonviable subcutaneous tissues and skin. Right above: Wound after deeper subcutaneous tissues were closed with catgut. Right center: Dissecting scissors being used to undermine skin for release of tension prior to suturing. Right below: Wound after closure. Subcuticular inverted chromic catgut and fine black silk for cutaneous suturing were employed

—either plain or chromic catgut—in the presence of saliva was contraindicated for reparative intraoral surgery.

The tongue was frequently the organ in which primary or secondary missiles lodged. Débridement of this extremely vascular organ was conservative with minimum tissue excision. Blunt probing for the missile was preferable. Small penetrating wounds of the tongue were occasionally left open after removal of the foreign body. The larger wounds were closed with black silk sutures. The tongue healed rapidly after such conservative débridement. Extensive dissection of the tongue usually led to profuse hemorrhage, which was difficult to control.

Bone injuries caused by missiles con-

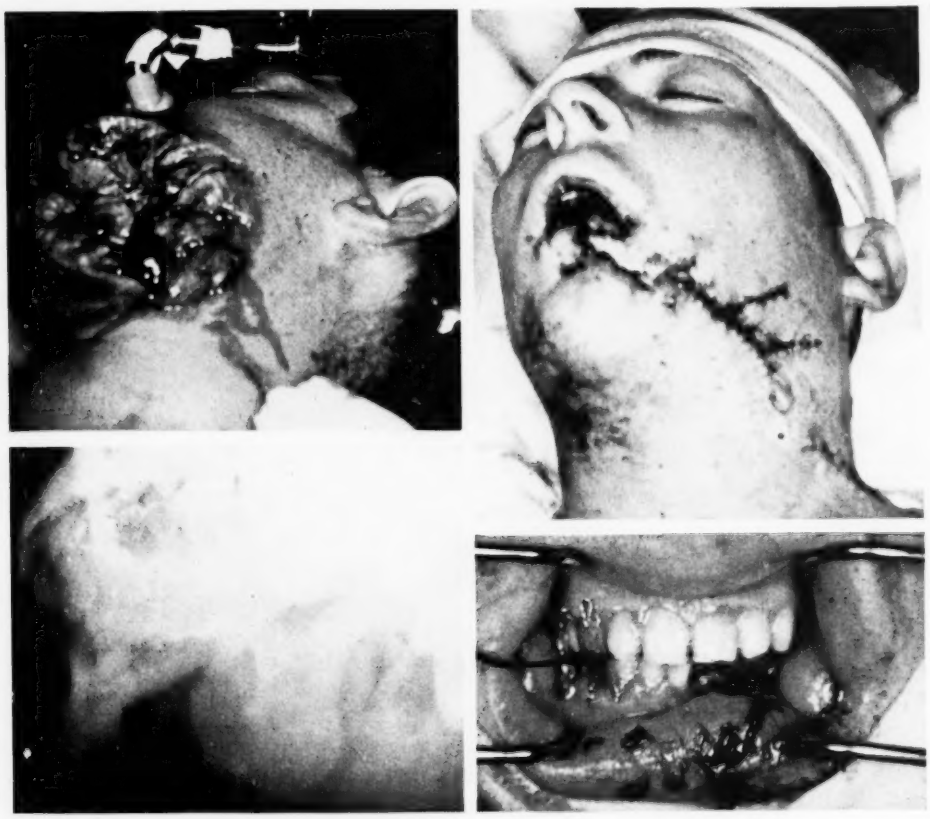


Fig. 6—Above left: Avulsive wound of lower jaw with penetration of shell fragment through neck into upper thorax. Symphysis of mandible intact. No respiratory difficulty. Above right: Primary closure of wound after débridement, with restoration of lower lip. Penrose drain in place. Below left: Postoperative roentgenogram showing position of fragments and degree of bone loss. Below right: Intraoral view showing occlusion of teeth after immobilization by interdental wiring and intermaxillary elastic traction. Rip cord applied for emergency release of elastic traction

Fig. 7—Above left: Avulsive wound of right side of face. Mortar fragment entered right cheek below ear and made its exit through right infraorbital region. Complete avulsion of right ramus of mandible and right maxillary alveolar process with extensive injury to infraorbital structures. Above right: Intraosseous wiring of infraorbital osseous tissues. Below left: Intraoral view, showing occlusion of teeth after application of interdental wiring and elastic traction. Below right: Appearance of patient on fourth postoperative day. Primary closure of wound prevented by gross loss of skin. Tracheotomy to permit anesthesia and unobstructed surgery. Right antrum packed with petroleum jelly gauze

sisted essentially of comminuted fractures with variable amounts of displacement or loss of fragments. All such injuries were compound fractures, frequently with oral contamination. Débridement of the osseous wound was extremely conservative (Fig. 8). To permit this type of débridement, all avenues of contamination had to be eliminated. Therefore, all oral procedures were completed first, including the employment of appliances for the immobilization of the fractured mandible or maxilla. After these steps and prior to débridement of the external wound, the patient was redraped and the contaminated gloves exchanged for sterile ones.

After removal of the foreign body, the oral wound was closed and the oral mucous membrane carefully sutured to prevent a future breakdown. A water-tight closure was obtained by the use of multiple interrupted silk sutures. This was considered an important step. Absorbable suture material should not be used to maintain a water-tight closure of the mucosa nor to protect the fractured underlying bone from future exposure. To prevent perforation of the mucosa, all sharp projections of bone were removed.

With the oral mucous membrane sealed, vigorous external irrigation of the wound was possible. The only bone sacrificed in bone débridement consisted of small spicules washed out during irrigation. The bone fragments were managed like a chip bone graft. Grossly displaced fragments were cleansed and repositioned. All pieces of bone, including those not attached to periosteum or any other soft tissue, were utilized to retain the continuity of the mandible and other facial bones. This procedure is contrary to that of other surgeons.[4,5] It is conceivable that a grossly contaminated wound exposed to oral secretions for several days might lead the surgeon to discard unattached fragments of bone. It has been the experience

4. Rush, J. T., and Quarantillo, E. P. Maxillofacial injuries. Ann. Surg. 135:205 Feb. 1952.

5. Bethea, H. The treatment of disfiguring injuries to the exposed parts of the face. Surgical Clinics of North America 33:109 Aug. 1953.

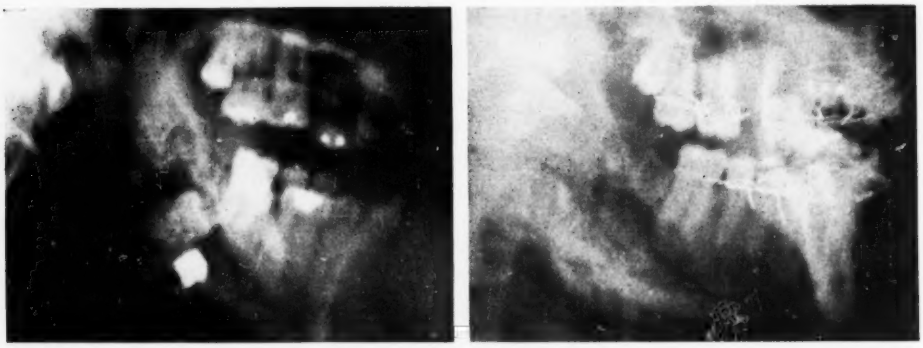


Fig. 8—Left: Compound comminuted fracture of body and ramus of mandible, caused by shell fragment. Right: Postoperative position of fragments after débridement and closure of wound. Immobilization by interdental wiring with intermaxillary elastic traction

of the author, however, that early débridement of bone has resulted in preservation of most of it. This conservative management of injured bone has proved practical. Follow-up reports on the cases operated on disclosed that sequestration of bone occurred most infrequently.[6] Adequate antibiotic therapy is of unquestionable importance in the conservative débridement of bone.

Adequate drainage was important in the treatment of these cases. This was obtained by the insertion of a Penrose drain with one end contacting the lowest portion of the fracture. The other end emerged through the tissue at a low point to allow gravitational assistance in drainage. Drains should never be placed in the suture line but rather through a separate stab incision made for the purpose. Drains were not used in all cases of jaw fracture but were reserved for those where contamination and comminution were great.

■ *Treatment of Fractures*

Osseous injury occurred in approximately 85 per cent of these 200 cases. Of this number, 123 were fractures necessitating some form of reduction and immobilization. The remainder were simple chip fractures, perforations of bones such as the palate or the ramus, or avulsion of a portion of a fixed bone such as the maxilla or zygoma.

In early management of severe traumatic facial injury, the simplest and most direct method of fracture reduction should be resorted to. Any item of armamentarium readily available and applicable in the operating room may be used. Prosthetic appliances, although desirable, are practical only in the intermediate or terminal phases of the treatment program.

Most of the 200 patients possessed either partial or complete natural dentition. The presence of teeth in a case of jaw fracture was considered a definite indication for conservative reduction and immobilization. For the majority of patients, some form of interdental wiring or labial arch bar was used. These appliances can serve either for permanent fixation or until a more stable appliance can be constructed.

All fractures of the mandible and maxilla were immobilized by the application of intermaxillary elastic traction immediately after the patient recovered fully from the general anesthetic. At no time were the maxillary and mandibular teeth wired together for fixation of a fracture of this type, since such a procedure is hazardous to the patient's life.

With the exception of Koreans, all patients with jaw fractures were evacuated by air to Army hospitals in Japan for postoperative care and disposition. Because of the possibility of nausea and vomiting and subsequent respiratory difficulty, a rapid means for releasing intermaxillary fixation became necessary. "Rip cords" were used for this purpose (Fig. 2, below left). These consisted of heavy suture material, no. 2 silk, circumventing the intermaxillary elastics. The cord was tied to the most posterior elastic. The two free ends enveloped the remaining elastics, protruded from the corner of each side of the mouth, and were taped to the cheek. One such arrangement on each side of the arch afforded complete release when

6. Chipps, J. E. Personal communication.

the cord was pulled by either an attendant or the patient.

Direct intraosseous wiring with stainless steel wire was used as a means of fixation in a number of cases. Exposed, displaced fragments of the periorbital region, the zygoma, the maxilla and certain mandibular fractures were treated in this manner. This treatment is less practical for older unoperated, contaminated fractures. No complications were observed in the patients treated.

External pin fixation was employed in a small number of cases where the procedures already described were not feasible. This method was used primarily in cases of comminuted, mandibular fractures with small bony fragments and edentulous mandibles with loss of bone (Fig. 9). No complications were observed or reported following the use of external pin fixation.

■ *Wound Closure*

A most important step in the treatment of these injuries was final wound closure. It is generally agreed that the optimum time for primary closure is in the first hours after injury.[7, 8] The rapid chain of evacuation provided the opportunity to use this step at the most advantageous stage.

Experience indicated that several factors are necessary for successful healing. In the first place, the success of primary closure depends on good débridement. A fine plastic closure may fail if undesirable factors are not eliminated. The wound should be closed in layers, and all dead space should be eliminated. To survive, exposed bone must be covered by subcutaneous tissue. When possible, bone should be covered with periosteum, and muscle tissue should be sutured to muscle tissue. Catgut is the most desirable suture material for closing subcutaneous tissues. Irrigation with normal saline solution should precede the closure of each successive layer.

Skin débridement should be conservative, with only 2 or 3 mm. of normal cutaneous tissue sacrificed. In large avulsive wounds of the face, all available tissue is needed for closure. This may have to include ischemic-appearing skin, which will vary in color from purplish red to blue. Frequently this is viable tissue that survives after repositioning and suturing when its circulation is restored.

Skin edges approximated under tension result in wide disfiguring scars. To eliminate this tension, the skin should be undermined and inverted subcuticular sutures used. The skin can be undermined by the use of scalpel or scissors. The latter method is semiblunt dissection and produces less hemorrhage. With this technic large facial wounds with skin loss have been closed by primary union.

Great care must be exercised in closing wounds about the infraorbital and nasolabial regions. Excessive distortion of the lips or nose to accomplish a primary closure is not practical. Such wounds should merely be débrided and prepared for subsequent skin grafting. Rotation and gliding flaps may be used to close smaller defects not lending themselves to a direct simple closure.

7. Kazanjian, V. H., and Converse, J. M. The surgical treatment of facial injuries. Baltimore, Williams & Wilkins Co., 1949, p. 73.

8. Harding, R. L. The early management of facial injuries. Mil. Surgeon 112:434 June 1953.

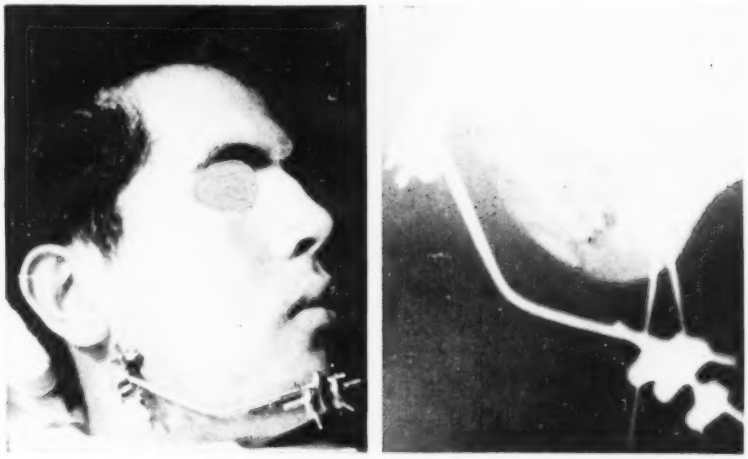


Fig. 9—Left: Position of external pin fixation appliance used in treatment of compound comminuted fracture of mandible, caused by shell fragment. Photo taken three weeks after débridement and primary closure of wound. Right: Roentgenographic view of fracture and of position of pins

The cutaneous tissue was manipulated carefully with fine thumb forceps or skin hooks. Absence of tension permitted the use of no. 5-0 black silk suture material for skin closure. The interrupted-suture technic was employed in all facial wound closures. Sutures placed about 5 mm. apart allowed accurate approximation.

Primary closure of approximately 5 per cent of the facial injuries was not possible without skin grafting. Since skin grafting was not performed in the forward medical installations, wounds necessitating this type of treatment received initial care, and the patients were evacuated to base hospitals. The initial care consisted of débridement of the wound, reduction and immobilization of jaw fractures and application of moist dressings over the uncovered tissue (Fig. 10).

■ *Postoperative Care*

After they were operated on, all patients with maxillofacial injuries were evacuated to base hospitals either in the Korean communication zone or Japan. Patients were usually retained for three to seven days, the duration depending on the nature of the case and its postoperative progress.

The success or failure of a surgical procedure is partially dependent on the postoperative care. To insure a suitable outcome, a routine was established. All operated wounds were immobilized by the application of pressure dressings maintained in position by elastic bandages. This procedure was helpful in controlling postoperative edema. The more severely wounded patients were carefully observed in a postoperative ward until they had recovered fully from the general anesthetic.

Tracheotomized patients received special attention. Frequent suctioning to alleviate respiratory obstruction and anxiety was provided.

Soft and fluid diets were available for patients unable to take the usual food. Those not able to take fluids by mouth received them intravenously. The daily volume administered was 2,000 cc. of 5 per cent glucose in distilled water and 1,000 cc. of 5 per cent glucose in normal saline solution. In hot weather the quantity was increased to about 4,000 cc. Adequate antibiotic therapy was continued.

Much effort was devoted to the maintenance of oral hygiene in patients with oral wounds. A mouthwash of warm saline solution was used for irrigation every four hours. If the patient was unable to perform this function, an attendant was available to assist him. After the third postoperative day dilute hydrogen peroxide solution was substituted for the saline solution.

■ *Summary*

The following conclusions are based on a study of the early management of maxillofacial war injuries incurred by 200 patients in the Korean military campaign.

1. Modern methods of medical evacuation and the availability of wide-spectrum antibiotics and whole blood are important contributing factors in attaining improved management of battle injuries.

2. The placement of qualified oral surgeons at forward medical installations permits definitive treatment at the initial operation.

3. Tracheotomy, a life-saving procedure, is sometimes necessary in treatment of maxillofacial injuries. The judicious use of the tracheotomy contributed to a mortality rate of zero in these 200 cases.

4. All wounds caused by missiles must be débrided before closure. Irrigation of the wound with normal saline solu-

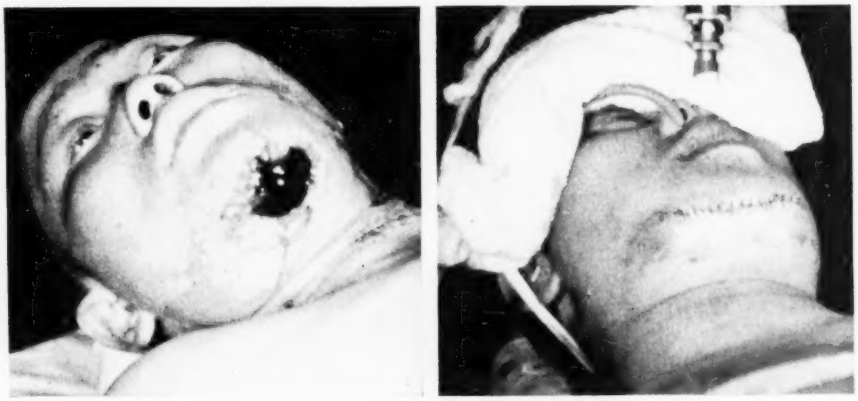


Fig. 10—Left: Shell fragment wound of chin with fracture of mandible and avulsion of skin in region. Right: Postoperative view showing primary plastic closure after débridement of wound and undermining of surrounding tissues

tion is necessary for good débridement.

5. Débridement of bone must be conservative. All bone should be retained, even if it is not attached to soft tissue.

6. Early treatment of jaw fractures is best accomplished by interdental wiring with immobilization by means of intermaxillary elastic traction. An emergency release mechanism has been devised for immobilized jaw fractures of patients who are to be transported.

7. Properly placed drains are an essential in the treatment of compound fractures of the jaws.

8. All cutaneous wounds should be closed without tension. This objective is best accomplished by undermining the skin and using inverted subcuticular sutures.

9. Good postoperative care of the patient leads to a more favorable prognosis.

■ Man's Study of Man

The human system is unbelievably complex, and its examination by research calls for all the science that man has yet learned and for much which is still a closed book. All this gives zest to our endeavor. It makes the study of man by man the most challenging problem that man can conceive. There will be many researchers, many papers, many lives lived, before there can emerge that integrated, complete understanding which alone can form a sound and adequate scientific base for the profession of medicine. And in the meantime we pursue individual paths, which continually diverge, which become daily more specialized; and there is danger that the pioneers on the boundary of knowledge will completely lose touch with one another, that we shall learn more and more about less and less, and that the grand design may be completely obscured by the inconsequential detail which we pile up before it.—*Vannevar Bush, "We Are in Danger of Building a Tower of Babel," Public Health Reports 68:150 February 1953.*

Further clinical observations on the use of antihistamines in oral surgery

■ *Roland E. Silverman, D.D.S., Tiffin, Ohio*

In a preliminary report[1] certain observations were made concerning the use of antihistamines in surgery and anesthesia. Early in their trial, even with haphazard dosage, the drugs produced satisfactory results after surgical procedures.

The information reported in this article is derived solely from the clinical application of the drugs. Until histamine and antihistamine levels in human tissues can be calibrated easily, it is only possible to make clinical observations.

It may be assumed that histamine is present in all tissues of the body; that it is believed to serve no physiological purpose; that its release follows any form of trauma, and that the pathologic effects produced by its release have been well established.[2] The antihistamines are drugs that, through a blocking action, prevent histamine from affecting adjacent cells.

In the work to be described, it was assumed that, by this blockade of histamine, the sequelae of trauma such as pain, vasodilatation or edema would be prevented. It has been demonstrated time and again that the action of antihistamines against histamine is specific. The preponderance of clinical evidence at this time suggests that the theory of histamine blockade offers a reasonable explanation for the changes that have occurred in oral surgery.

Such a blockade is brought about by an adequate level of antihistamine administered to the patient prior to surgery. The original preoperative dose usually is given by the intramuscular route because of the inconstant absorption factor noted occasionally. The oral route also has been used effectively postoperatively, especially after office procedures where the oral administration of the drug obviously is more practical. Naturally, when the injectable form is employed, it should contain the necessary concentration in the least possible volume consistent with minimal local discomfort and irritation. It should also be a very potent drug, having minimal side effects.

The question of "adequate levels" has posed a problem that will require further investigation. The dosage has been estimated on the basis of age and weight. The patient's emotional make-up has been considered as an additional factor. It appears that the unstable patient requires larger doses of antihistaminic medication. A connection has been suspected, possibly in factors that influence histamine release, between the emotional constitution of an

1. Silverman, R. E. Use of antihistamines in oral surgery; a preliminary report. J. Oral Surg. 11:231 July 1953.

2. Best, Charles H., and Taylor, Norman B. Physiological basis of medical practice, ed. 4. Baltimore, Williams & Wilkins Co., 1945.

individual and his ability to rebound from trauma.

The duration of histamine release from a wound has also remained a perplexing question. Its solution would be resolved if it could be determined that prophylactic treatment can be administered successfully. It has appeared that with successive increases in preoperative dosage, fewer postoperative complications have occurred. Therefore, our ultimate objective has been to determine accurately an optimum preoperative dosage based on the evaluation of the intended procedure. Up to the present time, continuation of postoperative dosage has extended through periods ranging from 24 to 48 hours. The length of time in most cases depends on the factors previously noted.

■ *Observations*

The following observations were made regarding the effects of antihistamines when used in connection with anesthesia, surgical procedures and drugs.

ANESTHESIA—A review of our experiences during the past 19 months has supported our supposition that inherent characteristics of the barbiturates have been responsible for a great proportion of the postanesthetic complications observed in intravenous anesthesia. Noteworthy effects produced by the use of antihistamines have been as follows:

1. Average amounts of barbiturates required by the individual are less than a year ago.
2. Manifestation of shock from anesthesia has been materially reduced.
3. Return to consciousness has been classified as immediate in practically all cases.
4. Postanesthetic complications have been reduced to a minimum.
5. The incidence of hiccoughing, sneezing, tremors, apneas and laryngospasms have been infrequent.
6. The hypodermic use of the antihistamine drugs has practically eliminated the occasional nausea and vomiting formerly seen after their oral administration.

SURGICAL PROCEDURES—Though the antihistamines have improved postoperative courses, it should not be assumed that they are capable of overcoming the damage that would result from poor or inadequate surgery. The following effects have been noted:

1. Acute postoperative infection of wound areas attributable to surgical procedures were observed rarely. Antibiotics were used only where physical histories warranted their use and where surgery was performed to interrupt an acute infectious process.
2. The great proportion of wounds healed by first intention.
3. Secondary hemorrhage as a complication of surgery did not occur.
4. Slough as a complication virtually was eliminated. Ulceration of needle sites in local anesthesia was not seen.
5. There was a tremendous reduction in the incidence of swelling. When it did occur, resolution was much more rapid than formerly.
6. Trismus was practically absent as a complicating factor.
7. Independent of their sedative action, these drugs appeared to be suc-

cessful in the prevention of pain. Although no anodynes were dispensed, only 5 per cent of the patients, on questioning, reported the necessity for pain medication.

DRUGS—The following effects were observed in connection with drugs:

1. Drowsiness and headache occurred in approximately 5 per cent of the patients.
2. Increase in dosage did not proportionately increase the intensity of the reactions.
3. The postoperative requirement for medication was low.
4. Occasional drowsiness of short duration was the only side effect noted when the injectable drug was used. This effect actually operated as an advantage since the drug was used prior to surgery.
5. No difficulty with injection sites was noted in approximately 800 cases where this method has been employed.
6. Co-Pyrinol[3] and tripelennamine hydrochloride (Pyribenzamine) were effective drugs for postoperative use. Co-Pyrinol was found to be the most satisfactory drug for postoperative use in the younger age group.
7. Much heavier concentrations than will be described were used in selected cases and were well tolerated.

■ *Results*

Four months ago, routine preoperative use of injectable antihistamines was begun. Variations in chemistry and in results obtained from their use necessitates naming the specific drugs used in our investigation. Reference to potency and side effects are based on our own impressions and not on those of other investigators and manufacturers.

In the most recent phase of our work, a new preparation of chloroprophenpyridamine maleate (Chlor-Trimeton Maleate Injection, 100 mg. per cc.—Schering[4]) was the first injectable drug investigated. It is a very potent drug at a concentration of 100 mg. per cubic centimeter. Preoperative dosage has ranged from 20 to 30 mg. (0.2 cc. to 0.3 cc.). In most cases, 30 mg. doses have been used. The drug was administered 30 to 60 minutes before surgery. Drowsiness was the only side effect noted. In average patients where trauma was moderate, 8 mg. repeat action tablets of chloroprophenpyridamine maleate were dispensed at the rate of four per day.

In more severe trauma where instability appeared to be a complicating factor, gradations in dosage ranged up to eight doses of two tablets each, given at the same intervals. When indicated, dosage was then reduced and extended for an additional 24 to 48 hours. Postoperative side effects were minimal.

Chloroprophenpyridamine maleate (Chlor-Trimeton Maleate Injection—100 mg. per cubic centimeter) was administered to 392 patients. Local anesthesia was used in 164 instances and general anesthesia in 228. The surgical procedures, as defined by the surgeon, were as follows: 1,797 simple extractions; 84 difficult extractions; 108 simple impactions; 52 diffi-

3. Co-Pyronil Pulvules and Pyronil Injection, and Pyronil Tablets 15 mg., were supplied through the courtesy of Eli Lilly Co., Indianapolis.

4. Chlor-Trimeton Maleate Injection 100 mg. per cubic centimeter and Chlor-Trimeton Maleate Repeat Action Tablets 8 mg. were supplied through the courtesy of the Schering Corporation, Bloomfield, N. J.

cult impactions; 14 cysts. Four dry sockets were treated; the average number of treatments were two. There were no postanesthetic complications.

More recently, we have begun the evaluation of Pyronil.[3] In its injectable form, it is at present available in concentrations of 4, 6 and 10 mg. per cubic centimeter. It is a potent drug. Preoperatively, its sedative qualities have been good. Postoperatively, it has been dispensed in 15 mg. tablets. The drugs were prescribed in the same manner as chloroprophenpyridamine maleate. Doses of 30 mg. have been well tolerated. Results after surgery have been good and the side reactions to the drug have been minimal. Time has not permitted the completion of a sufficient number of cases to provide an equitable comparison with the cases in which chloroprophenpyridamine maleate was used; however, the drug should prove effective. Higher concentrations of injectable Pyronil would reduce the volume now required for injection.

■ *Comment*

If antihistamines are to be employed in oral surgical cases, the following are among the questions which should be answered by further research:

1. Does the release of histamine from a focus affect normal tissues in a manner that would facilitate bacterial overgrowth?

2. Are constitutional extensions of disease processes in oral surgery due in part to the development of sensitivity to infecting organisms?

3. Is there a titration relationship between histamine and the antihistamines?

Search of the literature has failed to explain the mechanism by which the drugs produced the improvement noted.

The use of these drugs parallels the use of curare and many other drugs early in their development. Curare was criticized as a poison; however, its powerful effect on the central nervous system was investigated later and it eventually became an excellent adjunct in surgery. Its use was clinical until research took it out of empirical medicine.

At the present time it appears that a histamine blockade, adequately established, is of value in oral surgery. There is need for much additional work, not only to establish a theory of the action of antihistamines but also to increase the knowledge regarding their clinical possibilities.

Intra-articular injection of hydrocortisone into the temporomandibular joint

■ *Fred A. Henny, D.D.S., Detroit*

A careful review of the problem of the painful temporomandibular joint reveals several pertinent facts:

1. Diagnosis by physical examination and clinical impression appears to be well understood and accepted, but substantiation of the clinical diagnosis by roentgenographic study is not generally well understood.

2. There is disagreement over the theories of etiology.

3. There are many different methods of treatment; some are successful part of the time, but none are successful all the time.

It is obvious from these facts that the problem will probably not be solved by any one single form of therapy. It should be possible, however, to accept a single theory of etiology which would aid materially in the eventual development of a well-accepted treatment program.

Pain in the temporomandibular joint has been ascribed to the following factors: (1) posterior and superior position of the head of the condyloid process, (2) single acts of trauma, (3) pathologic changes in the meniscus, (4) malocclusion, either inherent or acquired, with occlusal imbalance and cusp interference.

All of these conditions result from forms of malocclusion. What is sometimes considered a posterosuperior position of the head of the condyloid process is largely a misinterpretation of roentgenograms. Reference to it is of importance only to note that if there is clinical evidence of loss of vertical dimension normal dimension should be restored. The vertical dimension should not be increased as a result of roentgenographic interpretation alone. It is well known that if the vertical dimension is increased beyond normal, an increase in pain and a depression of teeth will inevitably result.

Although single occurrences of trauma may well give rise to an acutely painful temporomandibular joint, if no occlusal abnormality exists, the pain will usually subside without complication merely with rest, heat and a soft diet.

Possible pathologic changes in the meniscus are edema, perforation and partial calcification. The latter two conditions develop only over a long period when adequate treatment is lacking, and they are usually accompanied by an occlusal defect that doubtless produces chronic irritation during jaw function.

Malocclusion itself may be inherent, or it may be acquired through loss of teeth which are not correctly restored. Occasionally, an upper third molar will

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erupt in such a manner that it interferes with normal jaw function and thereby causes a persistently painful joint in spite of otherwise normal occlusion. Likewise, the early loss of lower third molar teeth and the overeruption of upper third molars may give rise to occlusal interference and pain in the joint. Many other more complex occlusal disturbances arise, some of which require the extraction of teeth, others of which are best corrected by judicious occlusal adjustment and so-called equilibration. Correction of these abnormalities by a practitioner experienced in occlusion usually will result in permanent relief.

Since many patients have considerable pain when they first go to a practitioner, it is desirable to provide relief at the earliest possible moment. Prolonged dental appointments for occlusal adjustment, extractions or prosthetic reconstructions are not conducive to increased comfort. In addition to the pain, there may be considerable trismus, due to the decreased motion of the head of the condyloid process on the involved side.

In such circumstances a treatment that has been found highly beneficial at Henry Ford Hospital is the intra-articular injection of hydrocortisone acetate, 17-hydroxycorticosterone-21-acetate (Hydrocortone—Compound F). Injection into the upper and lower joint spaces of 37½ mg. (1½ cc.), divided into two doses of equal amounts, will usually result in relief from pain. The relief may be transitory, lasting only for two to three weeks, or may, in cases of acute injuries where no occlusal imbalance is present, result in a permanent cure. On relatively rare occasions, slight exacerbation of symptoms may occur for 24 hours, followed by the usual relief.

■ *Previous Experiments*

Hydrocortisone, which produces results by its specific local anti-inflammatory action, was first injected into an inflamed knee joint by Thorn[1] in 1949. Thorn noted an immediate beneficial effect; but since this effect coincided with generalized improvement of the patient, he interpreted the effect as systemic, and no further experiments on its local use were carried out by him.

Hollander[2] and his associates reported in December 1951 and later at the American Rheumatism Association meeting in June 1952 on 2,000 intra-articular injections in approximately 400 patients with various types of joint disease. Hollander noted improvement which was sufficient to warrant the procedure as therapeutically practical in 90 per cent of his cases. The injections were made into joints of many types, but the greatest success was noted in the knee joint. In two cases where the temporomandibular joint on only one side was painful, injections were made into the joint with Compound F. Relief was obtained in neither case.

It is of interest to note that Hollander first tried intra-articular injection of cortisone but obtained only transient results, averaging approximately 24 hours of improvement, as contrasted with an average

1. Thorn, G. W., and others. Clinical and metabolic changes in Addison's disease following administration of compound E acetate ((1-dehydro, 17-hydroxycorticosterone acetate). Tr. A. Am. Physicians 62-233, 1949.

2. Hollander, J. L., and others. Hydrocortisone and cortisone injected into arthritic joints; comparative effects of and use of hydrocortisone as local antiarthritic agent. J.A.M.A. 147:1629 Dec. 22, 1951.

of 7 to 10 days from hydrocortisone. It has been postulated that, since hydrocortisone is only a seventh as soluble in plasma as cortisone, it might diffuse less rapidly, serving as a local reservoir within the joint space.[1]

Hollander makes the additional observation that if the hydrocortisone is not injected into the synovial sac, no appreciable anti-arthritic effect can be expected, since the hormone cannot reach the inflamed synovial tissue. Obviously, some joints may respond better than others merely because of the accuracy or lack of accuracy in injection.

Ensign and Sigler[3] corroborated Hollander's results in a smaller number of cases. Their dosage was 25 to 50 mg. (1 to 2 cc.) for knee joints and correspondingly smaller dosages for smaller peripheral joints. Both studies indicate that similar results are obtained in cases of rheumatoid arthritis and osteoarthritis, although in the latter conditions the results are relatively greater and longer-lasting.

Neither author was able to predict how long the anticipated improvement would last, since the observed beneficial results varied from a few days to several weeks. No untoward results or reactions were noted in either study.

■ *Present Study*

Experience with hydrocortisone at Henry Ford Hospital has extended over the past 20 months and includes a total of 69 injections in 57 patients. Of these injections, 68 were made in patients with degenerative joint disease and 1 in a patient with acute rheumatoid arthritis. Decided relief of symptoms was noted in 54 of the 57 patients. Three patients required more than one injection.

All other patients had either complete relief or almost complete relief of symptoms within 36 hours. In each of these cases, treatment was begun immediately to establish occlusal equilibration; this treatment included extraction of teeth, insertion of fillings, relief from cusp interference, and construction of partial or complete dentures.

A few patients suffered discomfort during the period of reconstruction. One patient required an additional injection of hydrocortisone. The discomfort of the other patients was relieved with a soft diet, application of heat, or restriction of jaw opening. In three instances, bite planes were constructed for evening and night wear during the early stages of convalescence, since it was felt that bruxomania was an important factor in the patient's difficulty. No unfavorable systemic reactions were observed in any of these cases.

In the three cases where relief was not obtained with the injection of hydrocortisone, the joint changes were already far advanced. In one case there was roentgenographic evidence of erosion of the head of the condyloid process; in the second case osteophyte production on the head of the condyloid process was roentgenographically visible; and in the third case there was a history of prolonged trismus and little movement of the condyle on opening of the jaws. The first and third cases were treated by condylectomy,

3. Ensign, D. C., and Sigler, J. W. Intra-articular hydrocortisone in treatment of arthritis; present status. J. Michigan M. Soc. 51:1189 Sept. 1952.

Technic of injection

the second by meniscectomy. In the second case pain recurred after the operation, and eventually a condylectomy had to be performed. All three cases are asymptomatic at the present.

Two patients who obtained no relief from the first injection obtained relief from a subsequent injection. It can be assumed that the operator was unsuccessful in injecting into the joint space on the first occasion but was able to do so subsequently. A review of the cases with exacerbation of symptoms gives the impression that the injections were unduly traumatic, that needles larger than no. 25 gauge were employed or that there was undue probing to locate the roof of the glenoid fossa or the condyle. Development of a skillful technic is obviously of paramount importance.

■ *Technic*

The intra-articular injection is performed under local anesthesia. The skin of the patient's face is carefully prepared with a suitable skin antiseptic, and the skin of the operator's left forefinger is prepared similarly. The patient's mouth is opened approximately a third the full distance, and lidocaine hydrochloride (Xylocaine) is deposited after a test is made for possible vessel perforation. On withdrawal of the needle, it is brought out to a point immediately beneath the skin and is then thrust posteriorly, so that the soft tissues immediately overlying the joint are infiltrated.

A wait of five minutes is advisable prior to injection. The skin of the patient's face and the operator's left forefinger are again prepared with antiseptic. One and a half cc. (37½ mg.) of hydrocortisone is taken up into a Luer syringe. If the suspension has settled, it must be reagitated to promote equal distribution and diffusion of the essential material.

A no. 25 gauge, stainless steel, 1⅝ inch needle is attached to this syringe. The patient's jaws are opened and kept at approximately a third of the normal maximum opening. The needle is then inserted over the superolateral aspect of the joint, with the needle directed at the roof of the glenoid fossa, approximately halfway between its medial and its lateral confines.

Care is taken to enter the upper joint space without perforation of the meniscus proper. When the needle strikes the roof of the fossa, it is withdrawn approximately 1 mm., and ¾ cc. of the hydrocortisone is injected (illustration, A). The needle is then withdrawn to a point immediately beneath the skin (illustration, B) and is directed medially and slightly inferiorly to strike the head of the condyloid process in its mid-portion. When this occurs, the needle is again withdrawn approximately 1 mm., and the remaining ¾ cc. of hydrocortisone is injected into the lower joint space (illustration, C). Usually a small dressing is applied to the puncture point and is kept in place for a few hours.

■ *Conclusions*

Hydrocortisone has a specific action in the reduction of inflammatory changes within the temporomandibular joint. Its action is temporary; and if chronic irritative phenomena in the dental occlusion are allowed to persist, the pain is almost certain to recur.

Roentgenographic evidence of erosion

of the head of the condyloid process or proliferative changes within the joint are contraindications for injection of the drug. The treatment of such cases should be surgical; however, when indicated, intra-articular injection of hydrocortisone combined with correction of occlusal defects produces excellent results.

The greatest benefit from the intra-articular injection of the drug is the reduction of inflammation, pain and trismus. Relief is obtained with relative rapidity, and it becomes possible to proceed with an orderly program of occlusal rehabilitation.

The drug should not be considered as a specific cure but as a valuable adjunct in a well-organized program.

Atraumatic anesthesia for the child patient

■ *Edward C. Thompson, D.D.S., and Andrew M. Linz, D.D.S., Urbana, Ill.*

The development and refinement of anesthesia has proved the old adage that necessity is the mother of invention. Wells and Morton realized the need for elimination of the torture and shock that attended the crude surgery of the time, and they developed nitrous oxide and ether. Since that day, there have been numerous refinements of technic, and many new agents have been found.

The introduction of intravenous agents was a major advance that was not widely accepted at first. Hexobarbital (Evipal) was the first to become popular. One of us (E.C.T.) used this drug with several hundred patients and found that the chief objections were that it caused coarse tremors during anesthesia and prolonged postawakening intoxications.[1] Unfortunately, no serious effort had been made to utilize it in combination with nitrous oxide.

The use of thiopental sodium has reduced the patient's fear of anesthetic induction. Refinements in anesthesia for small children have been devised. In particular, rectal administration of agents gives hope that fewer neuropsychiatric problems will result from the memory of unpleasant operating room experiences.

Constant re-evaluation of the more commonly used agents, as well as an objective investigation of newer ones, is essential. In this paper an evaluation of

From the department of oral surgery, Carle Memorial Hospital and Carle Hospital Clinic.

1. Thompson, E. C. Evipal: a new general anesthetic as used in minor oral surgery. J. Missouri D.A. 15:5 April 1935.

anesthesia produced by the rectal administration of thiamylal sodium will be presented.

Unlike the inhalation anesthetics, the barbiturates are not subject to rapid elimination. Once an injection is made of a nonvolatile drug, there is not much that can be done to hasten its elimination. The principal guides to anesthetic depth are the rate and depth of respiration, reflex activity and, to a lesser degree, eye signs. The latter are masked and are not as reliable as they are when inhalation drugs are used alone.

■ *Theory of Balanced Anesthesia*

The use of a combination of two or more anesthetic drugs permits a greater margin of safety than if a single one were used. Since the dosage of each drug is less than would be required if used alone, depression of the vital medullary centers is less likely. In addition, the period of detoxification is shortened, and recovery is more rapid. Balanced anesthesia usually requires the use of one of the ultra-short-acting barbiturates as a basal anesthetic. The barbiturate is supplemented with an inhalation drug along with an adequate supply of oxygen. The supplements are delivered under pressure by way of a nose mask in all except infants and small children. The drop technic is used for them.

The barbiturate may be administered rectally to children or intravenously to any patient who has peripheral veins large enough to accommodate a needle of moderate gauge (usually 20 to 22 gauge). A single rectal instillation of a carefully calculated dose of thiopental sodium or thiamylal sodium will provide excellent basal anesthesia with a minimum of psychic trauma. Intravenous administration, on the other hand, can be controlled accurately by the use of fractional doses.

After the establishment of basal narcosis, the anesthesia is supplemented by the addition of inhalants. Nitrous oxide and oxygen, divinyl ether or diethyl ether, or any combination thereof, may be used to produce the desired depth for as long a time as necessary.

■ *Rectal Administration of Thiamylal Sodium*

The rectal administration of thiopental sodium and thiamylal sodium to produce anesthesia in children has largely eliminated the psychic trauma which is associated with inhalation anesthesia.

The fear exhibited daily by patients in dental offices often can be related to psychic trauma that these individuals experienced in childhood. These patients often retain their memory of some painful or frightening episode that occurred early in life; this may result in absurd prejudices and mental blocks regarding dental care. It therefore behooves members of the dental profession to avoid such psychic trauma whenever possible. When a surgical procedure has to be carried out in an infant or child, the rectal route is good for the administration of the anesthetic agent.

This technic has many advantages: (1) The child can drift peacefully to sleep in the presence of his parents, and the parents are reassured that their child will not be suffering an unpleasant experience; (2 there is no struggle during induction in the operating room or at the dental chair; (3) there is no need for premedication, nor is a needle puncture necessary;

(4) the incidence of postoperative vomiting is reduced when compared with that experienced with an inhalation anesthetic agent; and also, there is no undue stimulation to the salivary and mucous glands that such drugs as divinyl ether produce; (5) the risk of anoxia is largely avoided; (6) a general anesthetic can be administered in some instances where the inhalation technic might be contraindicated; for example, in the repair of a laceration on the upper lip; (7) there is practically no psychic trauma involved in this procedure, and (8) the temporary hemostatic gauze pack can be retained postoperatively in the mouth of the child patient over an adequate period of time.

The following disadvantages to the rectal administration of the anesthetic have been noted: (1) An occasional struggling child makes it difficult to insert the rectal catheter, but there is little doubt that such a patient would also struggle against an inhalation mask; (2) partial bowel evacuation may occur on relaxation of the anal sphincter during induction; however, this complication may be avoided by placing a wide piece of adhesive tape across the buttocks as soon as the anesthetic agent is instilled; (3) the recovery time is prolonged.

■ *Report of Cases*

The following is the report of 50 cases in which thiamylal sodium (Surital)[2] was administered rectally. This project was carried out with one of us (E.C.T.) acting as the surgeon and the other (A.M.L.) as the anesthetist in every case. Throughout the clinical trial of this drug, the following items were recorded in each instance: (1) name of patient; (2) sex; (3) age; (4) weight, in pounds, of the patient; (5) amount of thiamylal sodium administered; (6) the length of time that elapsed before the patient went to sleep; (7) the supplementary anesthetic agent, if any, used; the amount of this agent and the time over which it was administered; (8) type of operation and operative time; (9) evaluation of the patient's neuropsychiatric status; (10) reaction of the patient's family to this method of administration of anesthetic; and (11) evaluation of the anesthetic from the surgical standpoint.

In 16 of the cases, thiamylal sodium administered rectally was the sole anesthetic agent used. In the remaining 34 cases, this drug was supplemented with nitrous oxide-oxygen in 26 cases, with a supplementary block consisting of lidocaine hydrochloride in 3 cases, with divinyl ether in 3 other cases, and with nitrous oxide-oxygen plus divinyl ether in the remaining 2 cases.

In each instance the dose administered was 1 Gm. of thiamylal sodium per 80 pounds of weight as a 2.5% solution in distilled water. The time that elapsed after the instillation of the anesthetic agent until the patient was asleep was noted. It was found that the average child required from 8 to 10 minutes to lose consciousness. In none of these cases did a patient fail to go to sleep. The surgical procedures averaged eight minutes in duration; the longest case required 30 minutes operating time. Thiamylal sodium proved to be an excellent anesthetic,

2. Surital furnished through the courtesy of Parke, Davis & Company, Detroit.

and there were complications in only four instances.

In one instance, the patient experienced mild convulsions because of anoxia when the rectal anesthetic was supplemented with nitrous oxide. This occurred during the early administration of this supplementary agent. In the second instance, cyanosis developed postoperatively; this was attributed to hypertrophied tonsils and was readily treated with oxygen given under pressure.

In the third instance, nitrous oxide had been used as a supplementary agent, and a postoperative cyanotic state was produced that was caused by mucus secretion. In this case, the condition corrected itself without intervention. In the remaining instances, vomiting occurred after induction but before the patient had arrived in the operating room. The anesthesia otherwise was uneventful.

■ *Recommended Method of Administration*

A proposed method for rectal administration of the anesthetic follows.

PREPARATION OF THE PATIENT—Food and fluid are withheld for five hours preoperatively. A preoperative enema is not advised. It was discovered that the use of such enemas resulted in more frequent expulsion of the drug; however, the patient is encouraged to have a bowel movement on the day of surgery.

TECHNIC—After the weight of the individual patient has been ascertained, he is admitted to a recovery room in the company of one of his parents. Here the anesthetic solution is instilled by gravity into the rectum by means of a soft, lubricated urethral catheter. The catheter is inserted about 4 cm. into the rectum. If care is used to evacuate all the air from the catheter, no force is needed for the instillation of the solution, and there is no discomfort to the patient during this procedure. As soon as the catheter is withdrawn, a two inch piece of adhesive tape is placed over the buttocks to prevent the evacuation of the anesthetic fluid and bowel content. The parent is encouraged to remain with the child during this period. The room is darkened and the shades are drawn to simulate a bedtime environment. The child is told that in a short while he will be tired and that he will fall off to sleep. When he becomes unconscious, he is carried to the operating room and the necessary surgery is performed. If the procedure is a lengthy one, the anesthetic is supplemented by the addition of one or more anesthetic agents, if necessary. Struggling on application of the face mask is encountered rarely.

Thiopental sodium also can be used effectively by this method. Since it is slightly less potent than thiamylal sodium, the dosage is calculated at 1 Gm. per 70 pounds.[3] Because recovery from anesthesia produced by rectal administration of the drug is somewhat prolonged, adequate recovery facilities are necessary. This physical disadvantage is overcome, however, by the advantages of the atraumatic, anoxia-free anesthesia which is obtained by this method.[4]

3. Walton, C. H. Pediatric anesthesia without psychic trauma. In Selected papers of the Carle Hospital Clinic and Carle Foundation. 4:6 Jan. 1951.

4. Marbury, B. E. A study of the blood-oxygen saturation in children under rectal pentothal anesthesia. Anesthesiology 11:589 Sept. 1950.

■ *Summary*

During the past decade, great progress has been made in anesthetic agents and in the development of methods for administration. A technic for rectal administration of anesthetics for use with children has been presented. This method of administration lessens the psychic trauma to the child. A thorough training in anesthesiology is an absolute prerequisite when these methods are to be used, and no attempt should be made to administer anesthetics either rectally or intravenously without adequate preparation.

Significant tests in diseases having oral manifestations

■ *Victor H. Frank, D.D.S., and David R. Meranze, M.D., Philadelphia*

The accompanying chart has been compiled so as to correlate the results of laboratory tests and specific clinical findings in the majority of diseases that have oral manifestations. Burket's *Oral Medicine* and many other textbooks include charts listing aberrations from the norm in various diseases. In the present chart, the material is organized for the purpose of simplification. The grouping of the most common diseases makes them readily visible, and the most important laboratory tests and findings relevant to each specific disease and diagnosis are included.

Oral surgeons and dentists, particularly those associated with hospitals, may find the chart helpful as a ready reference for various laboratory procedures that are related to certain diseases. It should also be useful wherever a differential diagnosis poses difficulties, or in cases where the patient is suspected of having a specific undisclosed disease. Its value lies in the fact that it indicates the tests which should be ordered to prove or disprove clinical impressions.

An accurate diagnosis, however, demands a meticulous consideration of the following:

1. Complete history
2. Careful clinical examination
3. Variations in laboratory tests

Charts and synopses serve only to refresh existing knowledge or to present it in a

Chart of significant tests in diseases related to dentistry

GENERAL TESTS	C. B. C.				Platelets	Coag. time	Bleed. time
SUBDIVISIONS	Hb	RBC	WBC	Predom. cell		Depends on technic	
SPECIFIC DETERMINATION	Sahli 80-105%					(Lee-White)	(Duke)
NORMAL	Males 14.0-16.0 gm. Female 12.0-14.0 gm.	4.5-5.5 mil.	6,000-10,000		250,000-350,000	5—10 min.	1-3 min. may be up to 8 min.
DISEASES OF THE BLOOD							
Pernicious anemia	Low macrocytic		Hyperseg. polymorph	Megaloblast in bone marrow			
Secondary anemia	Microcytic Low hypochromic						
Aplastic anemia	Low		Low	Lymphocyte	Low	Normal	Prolonged
Polycythemia vera	Very high		Mod. high				
Multiple myeloma	Mod. decr. low		Slightly incr. or low		Usually normal		
Agranulocytosis	Normal		Low	Mature lymphocytes			
Acute leukemias (Lymphatic, Myelogenous, Monocytic)	Low		2,000 to 30,000 Occ. as high as 100,000	Blast	Low	Increased	Prolonged
Chronic leukemias (Lymphatic, Myelogenous, Monocytic)	Low		30,000-100,000 100,000-500,000 25,000-100,000	Lymphocytes 60-90% Myelocytes 20-60% Monocytes 50-90%	Low	Increased	Prolonged
Idiopathic thrombocytopenia purpura					Low	Normal	Prolonged
Hemophilia						Increased	Normal*
INFECTIONS							
Acute infections			10,000-30,000	Neutrophils			
Chronic nonspecific infections	May be low		Sl. to moder. elevation	Lymphocytes Monocytes			
Tuberculosis	May be decreased			May be lymphocytosis			
Mumps				Neutropenia Lymphs			
Whooping cough			15,000-30,000	Lymphs			
Infectious mononucleosis	Usually normal		Usually elevated	Atypical lymph			
Scarlet fever			Sl. elevated	Neutrophils			
Typhoid fever	Usually low			Lymphs & monocytes			
PARASITIC INFECTIONS							
Malaria	Mod. anemia						
Protozoan disease				May have eosinophilia			
Trichinosis				May have eosinophilia			
VITAMIN DEFICIENCIES							
Rickets							
Scurvy	May be mod. decr. or low						
ENDOCRINE DISEASES							
Hyperparathyroidism							
Addison's disease							
MISCELLANEOUS DISEASES							
Paget's							
Osteomalacia							
Hodgkin's disease				May have eosinophilia			
Gaucher's disease	Moderate anemia		May be leukopenia				
Allergic disease				Eosinophilia			
Pemphigus			May have eosinophilia				
Hypoprothrombinemia	Decreased when patient is bleeding						

Sediment rate	Blood chemistry		Urine		Alkaline phosphatase	Specific procedures and findings
	Calcium	Phosphorus	Calcium	Phosphorus		
(Cutler) Tech.					(Bodansky)	
1 mm. in 5 min.	9-11 mg% 4.5-5.5 m Eg/L	3.5-5 mg% 2.3-3.8 m Eg/L	0.1-0.3 gms daily	0.09-0.11 gms daily	up to 5.5 units (adults)	
						Bone marrow aspiration—gastric analysis with histamine
						Search for bleeding
						Bone marrow aspiration—poor clot retraction
Decreased						Bone marrow aspiration; hematocrit; blood volume
Increased	May be 12-16 mg%	Plus normal				Bence-Jones protein (urine); x-ray of skull; bone marrow aspiration
						Bone marrow aspiration
						Bone marrow aspiration
						Bone marrow aspiration
						Clot retraction delayed—positive tourniquet test
						*Severe bleeding possible if test is done in mod. or severe cases
Increased						
Increased						
Increased						Acid fast smear; culture; tuberculin test
						Cough plate culture
						Heterophil antibody
						Dick test; Schultz-Charlton test
Increased						Widal; bl. culture; feces culture; agglut. test
						Blood smear demonstrating parasites
						Skin tests fecal—Ova & parasites
						Muscle biopsy; precipitin test; Bachman react.
	Normal or low	Low	Low	Low	High	X-ray of bones
						Tourniquet test; vitamin C level; saturation test
	High	Low	High	High	Mod. high	
	Decr. Na, Sugar & Cl. K may be high		Incr. Na. & Cl. Decreased K			Low 17 keto-steroids
	Normal	Normal	Normal	Normal	High	X-ray of bones
	Low	Low	Normal or low	Normal or low	High	X-ray of bones
						Lymph node biopsy
Increased						Splenic aspiration; bone marrow aspiration
						Spec. skin & allergy tests
						Skin biopsy
						Low prothrombin time

concentrated, well-organized form. They should never be considered as a substitute for basic study or thorough reading of available information.

Additional, more extensive charts would also seem to be useful. Such charts would list a disease such as multiple myeloma with the following classification of signs and indicated tests:

Multiple myeloma

Roentgenographic: Areas of rarefaction in the skull and flat bones.

Laboratory tests: Blood RBC—moderately decreased or low.

WBC—usually normal, slightly up or down.

Sedimentation rate—increased.

Blood calcium—12-16 mg. %.

Specific procedure: Urine—Bence-Jones protein diagnostic in about 70 per cent of cases.

Serum globulin high.

Auto-agglutination *in vitro.*

Histopathology: Microscopic evidence of closely packed, often multinucleated plasma cells, oriented in broad sheets on delicate stroma which consists largely of capillaries. Presence of mitotic figures in plasma cells is further indication of the malignant nature.

Here again, the all-valuable clinical examination is not included. Such an examination is imperative since pathologists frequently require a careful clinical examination in addition to the biopsy before they will give an appraisal of a case.

In summary, it should be emphasized that the dentist is often the first person to see manifestations of systemic disease in his patients. Recognition of these manifestations and an ability to diagnose the condition correctly are essential if the patient is to have early effective treatment. In addition to this service to his patients, the alert dentist adds to the standing of his profession when he reports his findings to his medical confreres.

Significant laboratory tests are solely an aid, one comparable to roentgenographic study, and they supplement the history and the careful clinical examination.

Although this chart contains limited information, it will have performed its function if it is clipped and used as a handy reference aid and guide.—*1800 Pine Street.*

■ CONSERVATION OF HEALTH

Human health is the most valuable of our natural resources, and there has never been a time in the history of man when the human race needed so desperately to conserve its physical, mental and moral health and strength.—*James S. Simmons, "Education for Careers in Public Health," Postgraduate Medicine 13:281 April 1953.*

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CASE REPORTS

Heterotrophic tonsil located in the floor of the mouth: *report of case*

■ *Robert L. Shapiro, D.D.S., Louisville, Ky.*

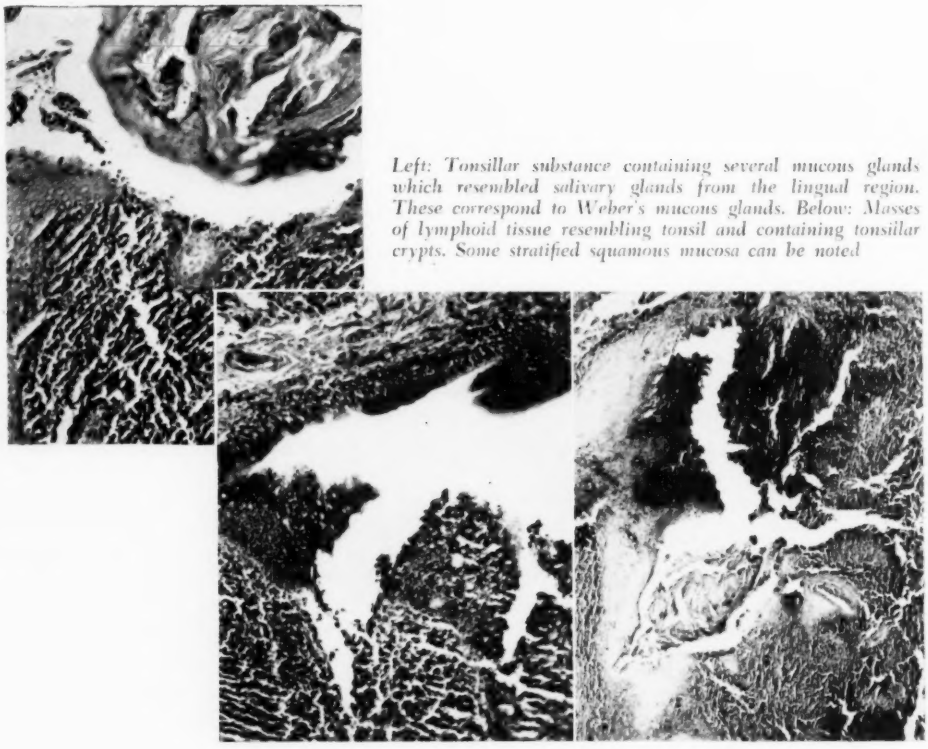
The term "tonsil" usually refers in a general way to the three most important lymphatic structures in the pharynx; namely, the palatine or faucial tonsil, the pharyngeal tonsil or adenoid, and the lingual tonsil, which is a collection of lymph follicles at the base of the tongue. Histologically, the normal tonsil is a lymphatic structure, usually enveloped by a connective tissue capsule except for its free side. Bands of this connective tissue usually extend into the tonsillar substance. The free surface of the tonsil is covered by stratified squamous epithelium in which there are many pits or depressions, namely, the tonsillar crypts. Throughout the main tonsillar substance, which is composed of lymphoid tissue, are scattered the lymph follicles. These follicles are arranged around the crypts. Located in the already mentioned connective tissue is some glandular tissue, predominantly mucous in character and sometimes referred to as salivary in type. They are known as Weber's mucous glands.

Embryologically, the tonsil is derived from the entoderm and mesoderm germ layers. More specifically, the tonsillar pillars arise from the second and third branchial arches, while the fossa is located in the second pharyngeal pouch between these two arches. This is the tonsil framework, but the characteristic cellular elements do not appear until about the fourth month in utero.

REPORT OF CASE—A 33 year old white man was admitted to the hospital on December 30, 1952, primarily for diagnosis and treatment of abdominal discomfort and generalized weakness. His abdominal complaints extended back to 1943. Finally in 1952 he had had an emergency operation for a perforated gastric ulcer. His complaints continued after recovery from the operation.

A routine oral examination was made on January 2, 1953. This revealed the dentition to be in a poor state of repair. The presence of many carious teeth was substantiated by intraoral roentgenograms. A small, smooth, pedunculated tumor was noted in the floor of the mouth just lingual to the right mandibular bicuspid teeth. It was not painful, and the patient had no knowledge of its presence. The remainder of the patient's physical examination was negative with the exception of the gastric ulcer. His past history was of no significance, and the routine laboratory studies were within normal limits.

OPERATION—On January 12, 1953, the growth was removed surgically. The region was anesthetized by infiltration with 2 per cent lidocaine hydrochloride (1:50,000 epinephrine). Elliptical incisions were made around the tumor, and by blunt dissection, the mass was completely excised. This left an apparently normal underlying tissue. No undue hemorrhage was encountered, and the mucosa was approximated with no. 000 interrupted silk sutures. Healing was uneventful, without swelling or pain. The patient was placed on a liquid



Left: Tonsillar substance containing several mucous glands which resembled salivary glands from the lingual region. These correspond to Weber's mucous glands. Below: Masses of lymphoid tissue resembling tonsil and containing tonsillar crypts. Some stratified squamous mucosa can be noted

diet for three days, and then food of whatever consistency he could tolerate. Postoperative medication included warm saline oral rinses after meals, and intramuscular administration of 300,000 units of penicillin daily for three days. On the fourth postoperative day, the sutures were removed. The patient returned periodically to the dental clinic for observation until February 9, at which time he was discharged from the hospital. By this time, healing was complete.

PATHOLOGICAL EXAMINATION—The entire specimen, which consisted of a small, firm nodule of tissue about 1 cm. by 0.5 cm., was sent to the pathology laboratory for examination and study. It was soft in consistency and pinkish-red in color. The microscopic report described the sections as soft tissue covered by stratified squamous epithelium of the mucous membrane type. Within the substance were several mucous glands resembling salivary glands from the lingual region (illustration, left). Beneath the mucosa were masses of lymphoid tissue that resembled a tonsil and contained tonsillar crypts (illustration, below). The diagnosis was a heterotrophic tonsil located in the floor of the mouth.

COMMENT—It was only by careful microscopic study that the nature of the structure could be determined. No definite information concerning its original occurrence or growth rate could be established. The preliminary consideration of fibroma or papilloma, based on location and gross appearance, proved to be entirely wrong.—*Veterans Administration Hospital.*

Roentgenographic interpretation in antrum surgery: *report of cases*

■ *Harold Boxer, D.D.S., Rockville Centre, N. Y.*

The following case reports illustrate the importance of using correct angulation in roentgenographic study of the antrum before surgery for the removal of tooth fragments is attempted. Many patients are referred to the oral surgeon with the dentist's comment, "I think I pushed the root into the sinus; it just disappeared." It then becomes necessary to determine whether the root actually has been displaced into the sinus proper, changed in position within an enlarged socket through excessive instrumentation, or whether it has been forced through the alveolar bone into the soft tissues. The ordinary intraoral roentgenogram is most helpful in such cases, with the socket of the tooth in question as the primary target and the same angulation used as if the extracted tooth were still in position.

CASE 1—The patient was referred because the apex of the palatal root of the upper right first molar had fractured during extraction. The operator had tried unsuccessfully to recover the apex. He told the patient to return the following day and at that time he reflected a palatal flap of tissue in order to gain access to the palatal socket. After considerable additional instrumentation, he reported that the root had suddenly disappeared.

The roentgenogram which the patient brought with him is shown in Figure 1, left. Another roentgenogram was taken to avoid superimposition of the malar bone (Fig. 1, center), and this view suggested that the apex might have been displaced within the socket. The palatal socket was explored carefully, but the apex could not be seen. It was located finally in the right antrum and was recovered through a standard Caldwell-Luc approach (Fig. 1, right).

CASE 2—The patient was referred by his dentist with a history of the apex of the upper left second bicuspid fracturing during extraction. An attempt had been made to remove the apex with elevators when it moved and no further instrumentation was attempted. A roentgenogram suggested that a portion of the root might still be within the socket (Fig. 2, left). A gingival flap was reflected, buccal bone was removed the length of the socket, until at the apical portion a jagged section of the frac-

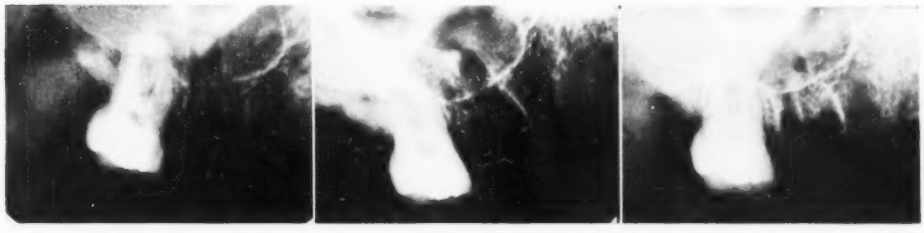


Fig. 1—Left: Root within antrum. Center: Root apparently remaining in palatal socket. Right: Antrum and tooth socket after removal of root

Fig. 2—Left: Root seemingly still within tooth socket. Right: Root removed from socket

tured end of the root could be seen still within the socket. The rounded apex portion was in the bony antrum proper, pressing against the antrum membrane. The root was removed by grasping the fractured edge with a hemostat (Fig. 2, right).

CASE 3—The patient gave a history of having had an upper left bicuspid extracted several years previously. The tooth had fractured during the process of extraction and the dentist had tried to recover the fragment but was unsuccessful. Routine roentgenographic examination (Fig. 3, left) revealed what appeared to be a root in the antrum. An additional roentgenogram was taken with more accurate angulation (Fig. 3, center) which revealed a much smaller root with a portion of it apparently beneath the antral floor. It was suspected that the fragment might be lying in the buccal soft tissues rather than in the antrum. A buccal mucoperiosteal flap was reflected and exploration of the soft tissue during this dissection revealed the root fragment to be lying on the wall of the buccal alveolus, encapsulated by fibrous tissue. A roentgenogram taken after removal is shown in Figure 3, right.

CASE 4—The patient had a history of fracture of the palatal root of the upper right molar; this had occurred during extraction of the tooth and the adjacent bicuspid. No attempt had been made by the operator to recover the root; the dentist stated that he had been fearful it might break because it was so crooked. Study of the preoperative roentgenogram suggested that the palatal root was fairly straight (Fig. 4, left) and the crooked portion was a separate fragment not connected to the molar. Another roentgenogram (Fig. 4, center) showed the fragment in the same position. The socket was explored, but no fragment was seen. At the apex of the palatal socket there was no bone, and the antrum could be entered. A standard Caldwell-Luc approach was made through the buccal bone, and a tooth fragment was recovered that was somewhat eroded and discolored (Fig. 4, right). It is my impression

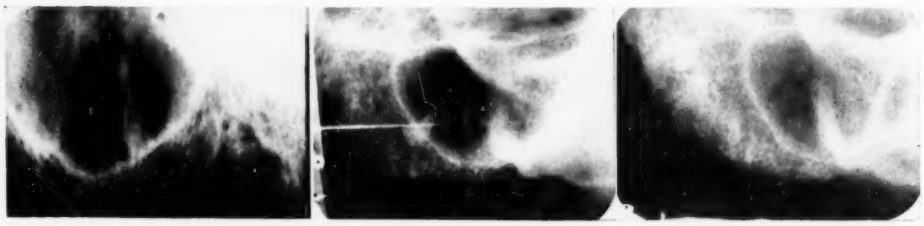


Fig. 3—Left: Root apparently within antrum. Center: Root lying partially outside floor of antrum, indicating that it may not be within antrum. Right: After removal of root from soft tissues

Fig. 4—Left: Preoperative view showing what operator thought was crooked palatal root. Center: Root remaining after extraction of molar. Right: After removal of root from antrum

that this root was displaced into the antrum during a previous extraction and that it had changed its position so that in the roentgenogram it became superimposed over the palatal root of the first molar. This had led the dentist who had performed the extraction to believe that he had fractured this section of the tooth.

SUMMARY—Four cases are presented to show the importance of correct roentgenographic angulation in determining whether fractured tooth fragments have been forced into the antrum. It frequently is advisable to obtain several views at varying angles to aid in an accurate preoperative diagnosis.—*21 South Village Avenue.*

Impaction of lower bicuspid by unerupted lower deciduous molar: *report of case*

■ *Edward E. Chase, D.D.S., U. S. Army*

A white woman, aged 35, was referred to the dental service of an Army hospital with the chief complaint of swelling of the lower right side of the mandible. The swelling had been present for two weeks. Oral examination revealed evidence of a mild, diffuse cellulitis of the tissues overlying the right side of the mandible posteriorly. The cellulitis was also evident intraorally along the crest of the ridge and into the mucobuccal fold. It extended from the cuspid to the second molar region. The second molar was the only lower posterior tooth present on the right side and showed evidence of deep periodontal bone loss. Roentgenographic examination (Fig. 1) revealed evidence of a partially resorbed, unerupted lower right second deciduous molar immediately overlying an impacted bicuspid.

PREOPERATIVE TREATMENT — Immediate treatment consisted of the intramuscular administration of penicillin, 300,000 units. This was continued for five days. Since the impacted

Lieutenant Colonel, Dental Corps, U.S. Army, 97th General Hospital, APO 757, c/o Postmaster, New York.

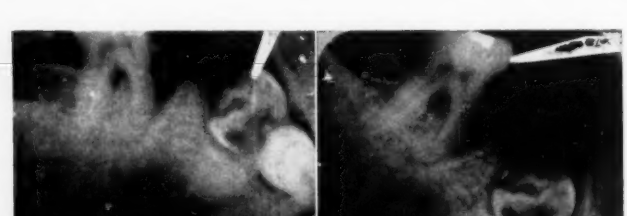


Fig. 1—Unerupted lower second deciduous molar with impacted unerupted permanent bicuspid

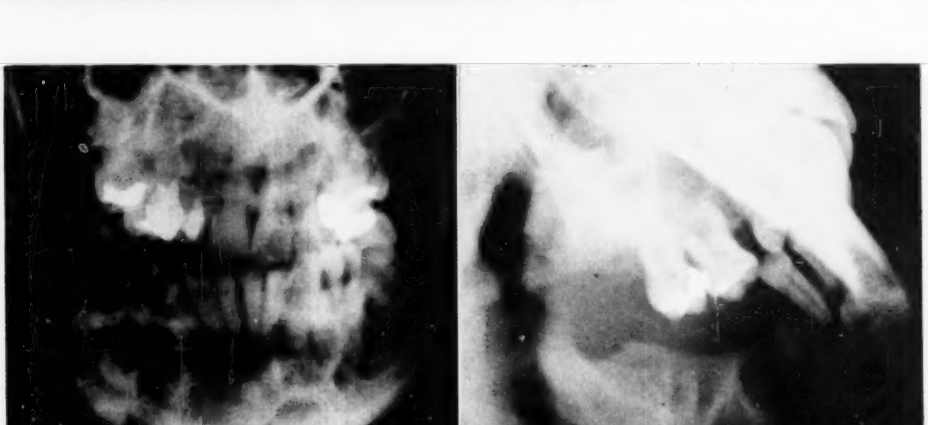


Fig. 2—Left: Immediate postoperative view showing involvement of inferior border of mandible. Right: View taken ten weeks postoperatively. Healing is progressing normally

teeth extended almost entirely through the mandible, it was decided to remove them prior to extraction of the second molar, since the second molar could be utilized for stabilization of the jaw if a fracture ensued during removal of the impacted teeth.

OPERATION—The following day, the impacted teeth were removed under 2 per cent procaine regional block anesthesia. An incision was made along the crest of the ridge. It was joined with vertical incisions in the second molar and cuspid regions. This allowed adequate access when the mucoperiosteal flap was dissected free and retracted. The deciduous tooth was extracted with little difficulty, but since the bicuspid was positioned buccally, it was necessary to section it. The crown was separated from the root and removed and the root delivered separately with a minimum loss of investing bone. The wound was closed with silk sutures which were removed on the fourth postoperative day. The lower right second molar was extracted six days later when it was evident that no fracture was present (Fig. 2, left). With the exception of a mild, persistent paresthesia of the right mental nerve, the postoperative course was uneventful. Roentgenographic examination ten weeks postoperatively (Fig. 2, right), revealed a normal healing

process. A lower partial denture was then constructed.

COMMENT—1. A case of double impaction of both deciduous molar and its permanent successor was corrected.

2. When indicated, treatment planning should include management of a possible mandibular fracture if one occurs during removal of the deeply impacted teeth.

3. Persistent paresthesia may be a troublesome complication, and the patient should be advised of this possibility prior to removal of such teeth.

Multiple impacted teeth: *report of case*

■ *Bruce L. Douglas, D.D.S., Rego Park, N. Y.*

A 20 year old sailor reported to the dental clinic at the U. S. Fleet Activities, Sasebo, Japan, because the teeth in one part of his mouth had not erupted. The deciduous teeth in the upper left quadrant had been extracted when he entered the Navy, and this exposed the unerupted permanent teeth. In the ensuing year and a half, however, none of the aforementioned permanent teeth had appeared in the oral cavity.

A roentgenographic study revealed that the upper left cuspid, the first and second bicuspid and a molar of extremely unusual appearance were in a peculiar position within the maxillary alveolar bone (illustration). The remaining teeth and bone were completely normal.

Since the patient was unable to masticate on the left side of his mouth, and it was felt that the construction of a unilateral partial denture was inadvisable because of the unerupted teeth, these unerupted teeth were removed in one operation. Convalescence was uneventful, and, after adequate alveolar healing, a prosthetic appliance was constructed to replace the missing teeth.

Initial roentgenograms led to the suspicion of an odontoma in the molar region, but it was found that the tooth simply was grossly malformed. The cuspid and bicuspids were normal in appearance.

Intraoral view of maxilla on left side showing malposition of cuspid, bicuspids and first molar

There was no history of trauma to the area, and apparently the deciduous teeth were not unusual. Thorough physical examination failed to reveal evidence of cleidocranial dysostosis or any other discernible physical disease.—93-08 *Queens Boulevard.*

Lieutenant, dental corps, U. S. Naval Reserve.

Treatment of chronic osteomyelitis with streptokinase-streptodornase: *report of case*

■ *Frederick C. Nichols, D.D.S., St. Petersburg, Fla., and Thorpe VandeMark,* D.D.S., St. Louis*

Recently some of the by-products of the growth of certain strains of beta hemolytic streptococci have been shown to be of value in the treatment of various acute and chronic infectious processes. These preparations, which contain the catalytic agent known as streptokinase and an enzymatic complex called streptodornase, are effective in liquefying clotted blood and thick, purulent exudates.

Streptokinase acts indirectly on the substrate of fibrin by activating a fibrinolytic enzyme in human serum, which then splits fibrin into its polypeptide components, thus causing a rapid dissolution of blood clots and fibrinous exudates. Streptodornase acts directly on desoxyribonucleo-protein and desoxyribose nucleic acid, hydrolyzing them in the presence of the catalytic agent magnesium or magnesium ion, thus causing a drop in the viscosity of purulent exudates.

Within the past several years these phenomena have been employed as an adjunct in the treatment of infectious processes in which tenacious purulent, fibrinous and sanguinous exudates have interfered with or prevented final healing. Some of the conditions successfully treated include hemothorax, empyema, osteomyelitis, chronic ulcerations and chronic maxillary sinusitis.

Best results are achieved in the use of these substances when the enzymes are brought into close contact with the diseased tissues and when subsequent evacuation of the breakdown products and residual irritants is as complete and as rapid as possible. Considerable thought and ingenuity often are required to provide intimate contact between the enzymes and the material to be liquefied, and at the same time to be able to efficiently and quickly remove the unwanted debris after the interaction has occurred.

It must be emphasized that these enzymatic agents are not specific curative agents but are only an adjunct to other modes of treatment. Once they have cleansed a region of debris, the other phases of therapeusis can be expected to be more effective, but these other phases still will be required.

The case to be described is one in which the usual means of treatment of chronic osteomyelitis of the maxilla were unsuccessful. The final resolution of the process by the use of streptokinase-streptodornase indicates that another valuable drug is available for use in oral surgery, although final evaluation must await further trial.

REPORT OF CASE—A 39 year old white woman, a deaf-mute, was first seen in the St. Louis City Hospital dental clinic on April 13, 1951. After a diagnosis of advanced periodontal disease was made, the extraction of all remaining teeth was begun.

Subsequent to the removal of the left maxillary anterior teeth, there was intermittent swelling and tenderness of the soft tissues of the left canine fossa. On April 19 the patient was admitted to the hospital for treatment since she was most uncooperative under local anesthesia, even when heavily premedicated.

An incision and drainage was performed and a large amount of purulent fluid and

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granulation tissue was removed from the involved region. Postoperative healing was uneventful, and the patient was discharged as fully recovered on April 25.

The patient was next seen in the dental clinic on July 3. At that time the right maxillary anterior teeth were extracted. On July 9 the patient returned to the clinic with noticeable swelling, elevation of temperature, inflammation and tenderness of the right canine fossa tissues. Roentgenographic examination of the region revealed an essentially normal postextraction site. Incision and drainage yielded 2 to 3 cc. of a thick, yellow, purulent fluid. The patient was given 300,000 units of penicillin daily, and she was instructed to use hourly saline irrigations and hot moist compresses externally at home.

Despite such treatment, drainage of small amounts of thick pus continued. The patient was again admitted to the hospital on July 20 at which time she received penicillin, 100,000 units every three hours; streptomycin, 0.5 Gm., every six hours; high vitamin, high protein diet; adequate fluid intake; hot saline oral irrigations hourly, and hot moist external applications continuously. Under general anesthesia, the region was incised, and a large amount of granulation tissue was removed for biopsy. A rubber drain was sutured into the defect. Examination did not disclose a sequestrum or any evidence of an oroantral fistula. The region seemed to heal quickly and uneventfully and the patient was discharged after three days but was told to return to the dental clinic for check-up. The report from the pathology laboratory was chronic inflammation.

On August 8 the patient returned to the outpatient dental clinic stating that drainage from the site of operation had been occurring intermittently for the past four days. Her oral temperature was 100°F. and her pulse rate was 96. Incision for drainage was performed, and a small amount of pus was recovered. A rubber drain was again sutured into the defect. Although not hospitalized, the patient received an aqueous suspension of procaine penicillin G, 300,000 units daily; oxytetracycline, 250 mg. every six hours; and she used oral irrigations and extraoral hot moist compresses as before. A specimen of the purulent fluid obtained was sent to the bacteriology laboratory where it was reported to contain predominantly alpha streptococci with some *Neisseria catarrhalis*. The organisms involved were also reported to be resistant to penicillin, streptomycin and to oxytetracycline.

On August 10 irrigation of the right maxillary sinus produced no evidence of communication with the oral cavity, and roentgenographic studies after the instillation of a radiopaque liquid into the sinus were similarly negative for oroantral fistula. Subsequent attempts to demonstrate a fistula by injecting the radiopaque liquid into the alveolar bony defect likewise were unsuccessful.

After this latest surgical procedure, and despite further outpatient care, the region never healed completely, and there was almost continual drainage of small quantities of purulent fluid.

On November 11 a course of treatment utilizing streptokinase-streptodornase was instituted. Through the existing opening in the alveolar ridge mucosa, approximately 1 cc. of a solution containing 5,000 units of streptokinase and 1,250 units of streptodornase was instilled into the bony defect. Within a matter of seconds, the reacting solution began to emerge from the opening, appearing as a thin, foamy, yellowish fluid. Digital pressure was applied over the region until all fluid was expressed, and the irrigation procedure was repeated until the return was clear in color. Then a small wick of gauze saturated with the solution of streptokinase and streptodornase was inserted into the defect, filling the void completely. This was left in place for a half hour. The region was irrigated again, and another gauze pack was inserted for one hour. Irrigation was repeated, and gauze was left in place for four hours. The gauze was then changed every six hours for the next 24 hours, and a final irrigation ended the procedure. The defect was left open, and the following day there was no evidence of purulent discharge. Within five days the mucosal opening was completely healed. The patient has been followed for the past seven months and there has been no recurrence of purulent discharge or inflammation.

COMMENT—On the basis of work done by others,[1] it has been shown that the value of these enzymatic agents lies in their ability to liquefy and thus, when evacuated, remove those substances which interfere with the normal reparative processes. Once they have caused dissolution of these unwanted substances, the resulting end-products must be quickly and completely removed from the region. Failure to accomplish complete evacuation may lead to further delay in healing and may even cause damage in itself.

Side reactions accompanying the use of these agents are usually minor, ranging from mild headache, dizziness, nausea, malaise and hyperpyrexia, to one reported case of more serious circulatory collapse. In the case herein reported, however, there was no evidence of any untoward reaction or side-effect. The serious reactions that have been reported usually have been attributed to a failure to promptly and completely remove the end-products of the enzymatic protein digestion. This again emphasizes the importance of prior planning for adequate drainage and, if necessary, aspiration of the liquefied debris to provide complete evacuation.

SUMMARY—It would appear that in the case reported, a chronic, low-grade osteomyelitis of the maxilla was resistant to the usual modes of therapy, including antibiotics, heat, diet, irrigations and surgical débridement. The use of the recently developed enzymatic liquefying agents known as streptokinase and streptodornase was effective in cleansing the involved region, permitting the tissues to heal normally. These drugs thus may prove to be of great value in the treatment of chronic suppurative problems encountered in oral surgical practice. —*2723 Central Avenue.*

1. Tillet, W. S., and others. Streptococcal enzymatic debridement. Ann. Surg. 131:12 Jan. 1950.

Management of displaced mandibular condyle: *report of case*

■ *J. H. Scanlon,* D.D.S., and W. S. Stryker,† M.D., Corona, Calif.*

A 35 year old well-developed white man came to the hospital primarily because of an extensive laceration of the buccal tissues on the left side. The body of the mandible was fractured obliquely and the fractured ends protruded through the laceration.

EXAMINATION—General physical examination revealed a possible fracture of the right fibula and minor abrasions. The sensorium was clear, the reflexes normal, the chest clear, and the blood and urine studies were within normal limits.

TREATMENT—Under general anesthesia, the facial laceration was corrected. The fractured mandible was manipulated and the ends were fixed in apposition by means of transosseous wire. Satisfactory apposition was obtained (Fig. 1, left).

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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†Commander, Medical Corps, U. S. Navy.

Closed reduction was carried out and a cast placed on the right leg. The patient was sent to the ward in good condition. Postoperative roentgenograms revealed that the left side of the mandible and the right fibula were in good position and adequately fixed. In addition, however, laminagraphic study showed a fracture of the mandibular condyle on the right side, with anterior and medial displacement of the condyle (Fig. 1, right).

The maxilla was edentulous but a satisfactory maxillary denture was in place. The patient was unable to maintain the mandibular teeth in normal centric relation to the denture. After the mandibular teeth were wired to the denture in normal occlusion, the deviation to the affected side was so persistent that the denture became dislodged and lacerated the oral mucosa.

Open reduction of the right temporomandibular joint was decided on, and an attempt to replace the condyle in the glenoid fossa was elected as a means of re-establishing vertical dimension of the ramus and balance for the external pterygoid muscle of the opposite side.

Ten days after admission, under general anesthesia, a preauricular approach to the temporomandibular joint was made by blunt dissection. The zygomatic and temporal branches of the facial nerve were identified and retracted from the operative field. Within the glenoid fossa, a portion of the capsule remained as well as the meniscus. The condyle was retrieved from its forward and medial position. There was no comminution and the periosteal covering was in good condition. A fine Kirschner wire was drilled from above, downward through the substance of the condyle. At this point an assistant, from outside the operative field, manipulated the jaw from inside the mouth in such a manner as to make the superior aspect of the ramus accessible. The condyle was worked down the wire to a reduced position, and the wire was advanced through the medullary portion of the vertical ramus until anchorage was obtained. The mandible was depressed so as to allow the condyle to resume its normal position in the glenoid fossa,

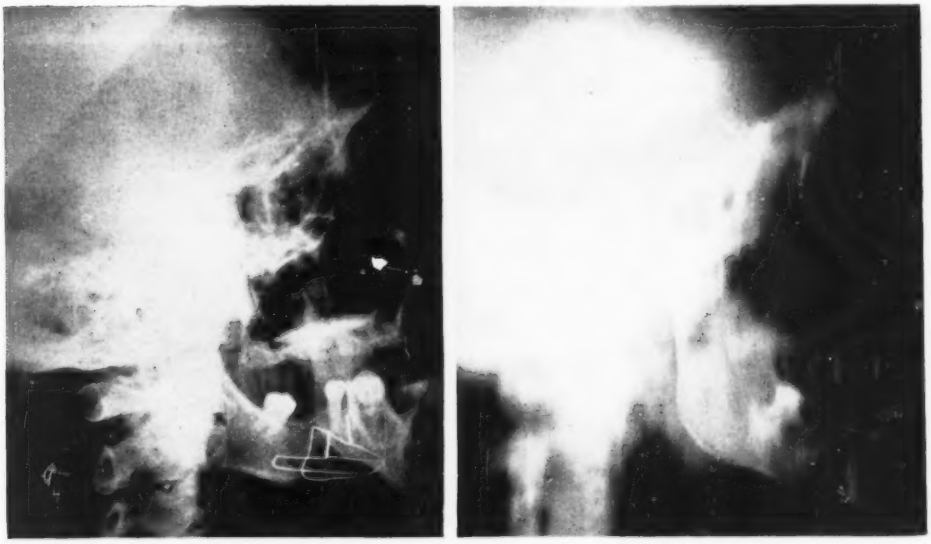

Fig. 1—Left: Ends of fractured mandible fixed in apposition by means of transosseous wires. Right: Fracture of right mandibular condyle with anterior and medial displacement of condyle

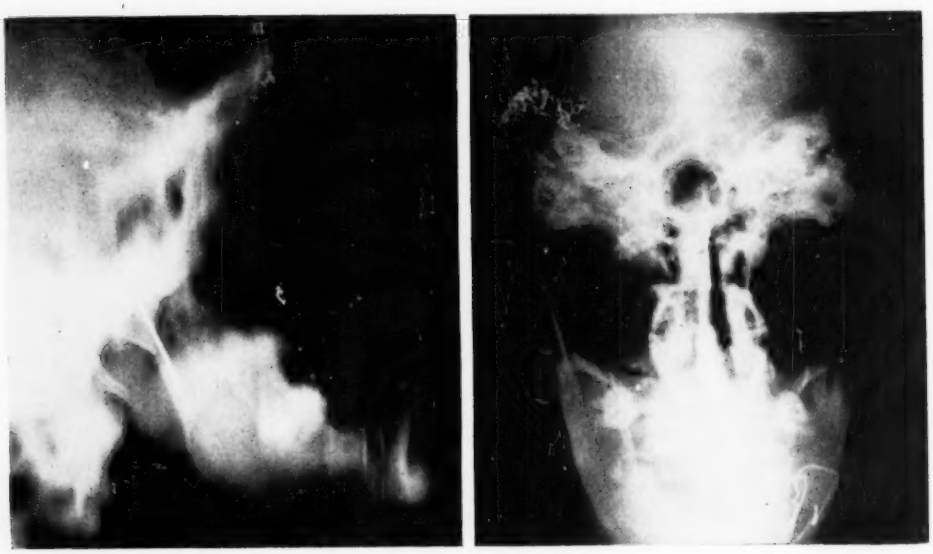

Fig. 2—Left: Condyle in position in glenoid fossa with wire through condyle and medullary portion of vertical ramus. Right: Postoperative view of fixation of fracture of mandible on left side by means of transosseous wire

and the wire was clipped flush and countersunk with a mallet (Fig. 2, left). The field was closed in three layers with no. 0000 chromic catgut and wire for apposition of the skin edges.

The postoperative course was uneventful. There was some diminution of the eye reflex and action of the frontalis muscle which was the result of trauma from the retraction; however, the condition was transitory.

The postoperative view with the Kirschner pin holding the right condyle in position and the intraosseus wire fixation stabilizing the fracture on the left side are shown in Figure 2, right.

COMMENT—This case illustrates one satisfactory method of maintaining a displaced mandibular condyle in reduced position. This must be considered as a preliminary report, however, since follow-up study and observation are still being conducted. This method is not always applicable because of technical difficulties. The present authors have had two cases in which the transosseous wire was resorted to because of inaccessibility of the joint cavity and inability to manipulate the vertical ramus into a lateral position. In addition, the possibility of resorption of the condyle must be considered, especially when the periosteum has been injured.

Postcollege education

THE AIM OF THE SPECIALTY of oral surgery is to serve the health needs of the population in an increasingly efficient and effective manner. The achievement of this aim demands a steady source of young men who are trained (1) in clinical oral surgery, (2) in the teaching of oral surgery and (3) in the principles of research. The most effective means of accomplishing this purpose is a broader utilization of graduate training.

The specific aims of postcollege training are: (1) to prepare the trainee as required by the Council on Dental Education and the American Board of Oral Surgery; (2) to educate teachers of oral surgery, not only professionally but also in the complexities of teaching and administration; (3) to offer the practicing oral surgeon an opportunity for continuing education; and (4) to provide the research specialist an adequate basic science background and technical guidance in research form. In a more general sense, the over-all objective of postcollege training is to broaden the perspective of the individual and to promote better interprofessional understanding through contact with members of the other health professions.

The specialty of oral surgery differs from other fields of dentistry in that formal training is not restricted to a university hospital and its attendant graduate school but may be obtained also in many general hospitals that have developed clinical programs to meet the requirements of the Council on Hospital Dental Service and the Council on Dental Education, despite the fact that they may have no direct university connection. In this regard, the growing practice of requiring that the trainee obtain a year of basic science study prior to two years of clinical training in a general hospital offers an opportunity for a vastly increased and constant source of well-trained young oral surgeons in the future. This increase, of course, augurs well for the future of oral surgery; but the complete development of this potential is dependent on the creation of additional centers for clinical training and the placement of capable teachers in these facilities.

There is a need also for postgraduate training, which will give the practicing oral surgeon the opportunity to take short, concentrated courses on specific subjects from established authorities. The institution of such courses as a part of the program of the annual meeting of the American Society of Oral Surgeons should prove to be a much needed stimulus and will be observed with interest from all quarters concerned. It requires the support of all oral surgeons, and the development of an outstanding faculty.

Graduate and postgraduate training in oral surgery have made rapid advances in recent years and promise to meet the needs of the future. If oral surgery is to continue to progress, however, the administrators, the educators and the practitioners in the specialty must all realize the importance of the various facets of postcollege education and direct their combined efforts toward the achievement of a well-balanced educational program. —*Fred A. Henny.*

A subscription to the Journal of Oral Surgery solves the Christmas gift problem

THE GIVING OF GIFTS at Christmastime by dentists to friends within the profession is an old established custom and one to be commended and encouraged. As the holiday season approaches each year, more and more minutes are spent worrying over a decision as to the most appropriate gift for a few choice dental friends. No need to worry longer this year because the solution lies before you. It lies in the little one page leaflet dropped between the opening pages of this issue.

What gift could be more appropriate from one dentist to another—what gift more timely, more attractive, more practical and hence more helpful than a subscription to the JOURNAL OF ORAL SURGERY? You, who are now a subscriber, know its value. Why not make its value available to others?

Simply fill out and mail in the subscription blank with your remittance to the Association. You will receive a note of acknowledgment and on December 1 the recipients will receive a dignified gift notice advising them of your thoughtfulness, the length of the subscription and the issue with which the subscription will begin. The Association is pleased to make the service available to you and trusts that you will take advantage of it.

■ A combination of two antihistamines, each given in one-half the regular dose, produces fewer side effects than when the antihistamines are given alone. The combination produces results as good if not better than those obtained with a single drug. A tablet containing 25 mg. of tripelennamine hydrochloride and 50 mg. of antazoline hydrochloride (Dibistine) may be used. Extensive research is in progress on the role of antihistamines in the reduction of undesirable surgical and anesthetic reactions in the field of oral surgery.

■ Many organisms have either an inherent or acquired resistance to such established antibiotics as chlortetracycline (Aureomycin), oxytetracycline (Terramycin), penicillin and streptomycin. Erythromycin is an effective agent against staphylococci, streptococci and pneumococci. Only rarely is a strain of bacteria naturally resistant to erythromycin. Therefore, erythromycin is particularly indicated in those cases where strains of bacteria are found to be resistant to penicillin and to other broad-spectrum antibiotics.

Some of the specific conditions which have responded well to erythromycin include osteomyelitis, sinusitis, otitis media, bronchitis, pneumonia and various infections of the skeletal and soft tissues in which the condition will allow the systemic-borne antibiotic to reach the infected region. Erythromycin is nontoxic within the therapeutic dosages, but when administered in excess of these limits it causes gastrointestinal irritation. Erythromycin does not predispose the patient to monilial super infection. It should be realized that resistant strains may increase in the future with application of the drug.

The drug is available in tablet form, either coated or uncoated, for oral administration. The coated tablet is designed to resist the acidic gastric fluids and to allow absorption in the upper intestinal tract. Oral administration for children is possible in a flavored, ready-mixed suspension. If the oral route cannot be used, the antibiotic may be given intravenously. The average adult dose is 200 mg. every four hours or 300 to 400 mg. every six hours, which dosage represents approximately 20 to 25 mg. per kilogram of body weight. For intravenous administration of 250 mg. every six hours, the agent is dissolved in buffered solution.

■ Within the past year a new specific antidote for morphine overdosage has been developed. Nalorphine hydrochloride (Nalline) is a specific drug to combat morphine toxicity. The dosage is 5 to 10 mg. given intramuscularly, and the effects last for about two hours. The agent appears to be relatively safe except when an overdose is given, in which case it acts as an analeptic and produces convulsions. In addition to its effect in combating the respiratory depression and other toxic signs of morphine, the agent appears to be an effective antidote for all synthetic analgesics.

■ Interest in the use of sulfonamides as therapeutic agents has been reawakened by the development of new sulfonamide agents and by the appearance of staphylococci and other strains of bacteria which are resistant to the broad-spectrum antibiotics. These sulfonamide agents are less toxic than the earlier products because of the elimination of renal damage, urticaria, gastrointestinal disturbances and hyperthermia.

Renewed interest has been manifested in sulfadiazine because of its stability, low cost, tolerability and effectiveness. Sulfadiazine is

Readers are invited to send their clinical observations to the editor, Fred A. Henny, Henry Ford Hospital, Detroit.

used effectively in combination with sulfamethazine and sulfamerazine.

Sulfisoxazole (Gantrisin) is a single sulfonamide that is highly soluble and has a wide antibacterial spectrum. It has been employed for treatment of streptococcal infections and is effective also against staphylococci and pneumococci. The administration of any of the chemotherapeutic sulfonamides is particularly indicated in the event of a milder infection by a susceptible organism. This reserves the antibiotic agents for the more extensive and serious infections. The possibility of reducing patient sensitivity and the number of antibiotic-resistant strains of organisms through the use of sulfonamides appears to be an advantage.

■ A new drug is receiving wide clinical trial for control of nausea and vomiting. It is chlorpromazine hydrochloride (Thorazine). The drug possesses a wide variety of pharmacodynamic possibilities. It has several unique effects on the central and autonomic nervous systems, on the cardiovascular system and on the skeletal-muscular system. Its side effects include hypotension by sympatholytic action and hypothermia, with central effects in the midbrain region. The drug is available in tablet form as well as in ampule form for parenteral use. The oral dosage is 10 to 50 mg. daily in divided doses, with the usual regard for dosage modification. It should be used cautiously until more definite evidence is accumulated regarding its application and effect.

■ When a general anesthesia of the nitrous oxide, oxygen, trichloroethylene sequence is given, the oropharyngeal partition, or "throat pack," is extremely important in maintaining an undiluted mixture of the anesthetic gases. Layers of gauze are commonly used in the construction of this partition; however, air will still pass through as many as ten layers of gauze placed together.

A better seal can be obtained by the use of dry cotton cut approximately five inches long, three inches wide and one inch thick. A string tied around the middle as a safety precaution can be pinned to the outer clothing. This easily sterilized partition can be inserted before the anesthetic is started or after the patient is asleep. It is not unpleasant and can be tolerated by most people while awake.

The correct placement of the pack is important. With the tongue pulled forward, the pack is doubled and placed on the tongue with the open ends toward the posterior of the mouth. The pack is then rolled back over the dorsum of the tongue until it is over the greatest height of contour. When the tongue is released, the pack will open, thus forming an effective seal.

■ If a primary or a metastatic malignancy has developed in the region between the superior cervical ganglion and the carotid artery so that it causes impairment or disruption of the fibers of the sympathetic chain, the regions of the head supplied by each of the four cranial autonomic ganglia are affected. The results of such a lesion are known as "Horner's syndrome." This syndrome is characterized by the following physiological phenomena: (1) a general unilateral flushing of the face, (2) a permanent constriction of the sphincter pupillae (miosis), (3) a slight drooping of the eyelid (ptosis), (4) a general dryness of the skin on the same side of the head (anhydrosis). The secretion of the glands in the nasal and oral cavities usually will be diminished, thus giving an unpleasant, dry sensation to one half of the patient's nose and mouth.

A lesion may develop elsewhere along the sympathetic chain, eliciting only a partial syndrome. For instance, if the interference occurs not at the superior cervical ganglion but in the cavernous sinus, the only effect then would be in the regions supplied by the ciliary ganglion. In this case miosis and ptosis would occur. If a lesion involves the sympathetic fibers in the wall of the internal maxillary artery near its origin, then the glandular secretory changes and vasodilatation occur only in the region supplied by that artery.

■ Extraction and Roentgenotherapy

Q.—If the teeth are to be removed from regions of the jaws which are to receive extensive irradiation therapy, are there any precautions which should be taken? What period of time should be allowed between the extractions and the start of the roentgenotherapy?

A.—Some difficulties have arisen in treating patients with mouth cancer when teeth have been extracted without consideration for the remaining alveolar process and where the roentgenotherapy has been started immediately. Protruding alveolar irregularities and delayed zones of healing have produced immediate complications of exposed necrotic bone. In several large treatment centers, the policy is to remove the teeth and perform an extensive alveolectomy, eliminating all irregular process and providing complete soft tissue coverage. A period of ten days is allowed for soft tissue healing, and the regions are carefully inspected for completeness of coverage before roentgenotherapy is begun.

■ Cyst of the Jaw

Q.—What are the possible postoperative complications of a Partsch operation on a large dentigerous cyst of the jaw?

A.—When a conservative unroofing procedure on a cyst of the jaw is to be performed, full diagnostic confirmation should be obtained before surgery. This entails submitting a section of the cyst wall for pathological examination and the making of a thorough inspection of the cystic cavity to be sure that the lining is uniform and typical. The chief postoperative complication is the premature closure of the surgical opening and the recurrence of the cystic process. It is important, therefore, to maintain the opening until the regeneration of bone and obliteration of the cyst have been completed. Various types of perforated acrylic plugs have been found useful for this purpose.

■ Persistent Ulcerative Stomatitis

Q.—A patient has been troubled for 15 years by a persistent ulcerative stomatitis, which has left deep scars through the oral mucosa. She is very rarely free of new ulcers and has received various local and systemic treatments. Do you have any suggestions for investigation or treatment?

A.—The brief description of the case suggests a diagnosis of periadenitis necrotica recurrens, which is a most troublesome clinical problem. These patients have usually run the gamut of investigation of nutritional deficiencies, allergic phenomena and all forms of local treatment. Long remissions of symptoms have been achieved through the utilization of cortisone for limited periods of time. All of the important precautions in the administration of cortisone, with close medical management, must be observed with these patients if complications are to be avoided.

This section, devoted to queries and comments from readers on topics of current interest to oral surgeons and general dental practitioners, is edited by James R. Hayward, University Hospital, Ann Arbor, to whom readers are invited to send their communications. The answers, prepared by competent consultants, do not necessarily represent the opinions of any official scientific organization. Your participation in this section is invited.

The Editor

■ Biopsy of Irradiated Tissues

Q.—Is there any hazard involved in the biopsy of a small suspicious region in the soft tissues of the mouth when the patient has had extensive roentgenotherapy in this zone within the past year?

A.—The alteration of tissues which have been irradiated demands caution. Relatively minor trauma may precipitate tissue necrosis which is very troublesome. In a case of this sort it is always best to consult with the therapist to determine the original appearance of the region and its subsequent changes. If there is definite evidence of persistent neoplasm, it must be investigated by biopsy. However, this investigation should be agreed upon by all concerned with the case, and the possibilities of tissue necrosis following the biopsy should be understood.

■ Use of Efocaine in the Treatment of Pain

In the *Queries and Comments* section of the January 1954 issue of the JOURNAL OF ORAL SURGERY it was suggested that Efocaine could be used in a conductive block for the relief of pain after dry sockets. Five of our readers have been kind enough to submit numerous references and reports of original work on the imminent dangers and the contraindications for the use of this drug for the stated purpose. The preparation of the *Queries and Comments* section precedes publication by several months, and the suggestion regarding Efocaine was made prior to the publication of several reports condemning the use of this agent.

In summarizing the comments of the five contributors and their many references, it may be stated that local necrosing effects of Efocaine occasionally may produce considerable pain and soreness at the site of injection, an acute inflammatory reaction, neuritis, neuralgia and thrombophlebitis. The effects of this agent are considered by some workers to be similar to alcohol, and, indeed, the solvent for the drug (propylene glycol and polyethylene glycol) will produce anesthesia.

Among the many references cited by the contributors, the destructive effects of this drug are reported by Mannheimer, Pizzalato and Adriani in the *Journal of the American Medical Association*, January 2, 1954. A further study by Piro and co-workers on the specific application of Efocaine to oral mucous membrane tissues appears in the July 1954 issue of *Anesthesiology*. Their approach to the study is both clinical and histopathological in order to determine the effect on tissues. Although they found inflammatory reactions, the reactions appeared to be readily reversible without permanent alteration of tissue. No permanent or delayed paresthesias resulted from the use of Efocaine, although none of the injections were in the regions of major nerve trunks. It is evident that the necessary precautions in the clinical applications of this drug must be observed carefully.

We wish to thank the following readers for their interest and contributions: Richard S. Polachek, Cleveland; John Whinery, Amarillo, Texas; Richard L. Lyon, Alton, Ill.; Paul E. Jurgens, Minneapolis, and Samuel G. Sanders, St. Louis.

■ Atropine in Combination with Anesthesia

Q.—In intravenous barbiturate anesthesia where atropine is utilized, is the atropine as effective when added to the intravenous solution as when it is given prior to the induction of anesthesia?

A.—The more important advantages of atropine in drying secretions and in reducing vagal reflexes are most significant in the early stages of anesthesia. If atropine is added to the intravenous solution, it may be diluted to an ineffective level, and the desired effect may not be obtained until anesthesia has been in progress for some time. It seems rational, therefore, to administer atropine before the induction of the anesthesia.

■ INTERNAL MEDICINE IN DENTAL PRACTICE. By Bernard I. Comroe, Leon H. Collins, Jr., and Martin P. Crane. Fourth edition. 563 pages with 83 illustrations, 30 in color. Index. Price $7.50. Philadelphia, Lea & Febiger, 1954.

This book continues to be one of the most valuable in any dental library. Composed of 15 chapters on widely diversified subjects, it presents internal medicine in a concentrated form which makes the book an exceptionally fine reference work. Both its organization and style contribute to easy reading. Summaries, presented in concentrated form and outlined by heavy markings, make possible rapid utilization of the text. Normal laboratory values of clinical importance, including those of blood, urine and cerebral spinal fluid, plus several tests of the functional type are indexed.

A large and important section is devoted to diseases of the heart and their relation to dentistry. A summary of the operative risk of different types of cardiac patients, including a discussion of the indicated anesthetic agents, is included in box form. Another section which is especially comprehensive and worthy of comment is the one devoted to diseases of the blood and the blood-forming organs. This section includes a discussion of the normal blood cell forms and counts and summarizes with clarity the conditions in which alterations from normal occur. The anemias, leukemias and hemorrhagic diseases are carefully classified and discussed in detail to give the reader a good working knowledge of the subject.

The section on endocrinology, although thoroughly covering the subject, lacks some of the clarity of other chapters, especially in the discussion on the use of the recently developed hormones. Future revisions of the text can profitably include considerable expansion in this field. The antibiotics also are inadequately covered, with only four pages devoted to discussion of this very important subject.

Despite these two instances of inadequacy, the book is outstanding in its excellent application of internal medicine to the practice of dentistry. It can be recommended with enthusiasm.—*Fred A. Henny.*

■ ORAL HYGIENE. By Russell W. Bunting. Second edition. 283 pages with 204 illustrations. Index. Price $5.50. Philadelphia, Lea & Febiger, 1954.

This excellent text, although written specifically for use in the teaching of the dental hygienist, is useful also in the teaching of preventive dentistry to the dental student. It has been completely revised with the individual chapters written either by Russell W. Bunting or by one of the eight contributing authors, each of whom is an authority in his chosen field.

The subject matter is well chosen, so that the reader is given a clear picture of the normal anatomy, histology and physiology of the oral structures. The pathology of dental caries, periodontal disease and the various types of stomatitis is adequately covered. Throughout the text, emphasis is placed on the fact that, although the hygienist is not educated to make a specific diagnosis, she should be able to recognize oral and dental abnormalities and bring them to the attention of her supervising dentist.

Description of treatment is limited to those procedures which the hygienist is legally allowed to perform. The chapters on the role of the dental hygienist in public health and dental health education are interesting and well done. Considerable emphasis is placed on the importance of the dental hygienist in the practice of preventive dentistry in the control of both periodontal disease and dental caries.

It is the reviewer's opinion that this book is of value to dental students and to specialists in oral hygiene.—*Zar A. Reader.*

■ ANATOMY FOR SURGEONS, vol. 1. By W. Henry Hollinshead. 560 pages with 326 illustrations. Index. Price $12. New York, Harper & Bros., 1954.

This book is one of three volumes concerning the anatomy of the human body. The author has advanced many new concepts of anatomy which will interest the graduate student and which are especially valuable to the oral surgeon.

The book is organized into sections according to the regions of the body. The sections on "Fascia and the Fascial Spaces of the Head and Neck," "Face," and "The Jaws, Palate and Tongue" are characterized by short but adequate descriptions of the anatomic structures.

The ample use of illustrations and the clarity of writing combine to produce a technical book which is outstanding for its readability. To get the most from the book, the reader should use a suitable anatomical atlas as he reads. The author makes frequent reference to original articles in the literature, which the reader may use as a guide to further study. Extensive reference lists also are included at the end of each chapter.

Anatomy for Surgeons is a well-organized, up-to-date presentation of anatomy. Since it includes information of importance on various operations, it is especially valuable for anyone interested in surgery.—*Robert R. Craig.*

■ THE MANAGEMENT OF PAIN. By John J. Bonica, M.D. 1,533 pages with 785 illustrations. Index. Price $20. Philadelphia, Lea & Febiger, 1953.

In contrast to books which have been written specifically on the subject of anesthesia, this excellent work covers the entire field of pain and the present concept of its alleviation, whether the pain be due to operative procedures, psychosomatic disturbances or organic disease. Its heavily illustrated 1,533 pages are divided into three main parts.

Part I, consisting of 162 pages, is devoted to a discussion of "Fundamental Considerations." This includes chapters on the anatomical, neurophysiological, physiopathological and psychological bases of pain, plus a chapter on the mental and physical effects of pain. This section includes a careful discussion of neuroanatomy nerve distribution and the physiology of the nervous system.

The author here emphasizes the importance of the dual aspect of pain consisting of two main processes: the perception of pain and the reaction to pain. He brings out the point that, while pain perception is a purely sensory phenomenon, pain reaction is a physiopsychologic phenomenon of considerable relative importance. A discussion of the factors which influence pain threshold follows and methods of measurement are suggested.

Part II includes 503 pages devoted to a generously illustrated, thorough description of the methods used in the management of pain. Of these, 318 pages are used in presenting specific nerve-blocking technics, always including a discussion of the physical and physiological problems of each procedure. The illustrations of this portion of the text are especially well done. Both intraoral and extraoral blocks of the various divisions of the trigeminal and cervical nerves are, of course, included.

"Methods of Alleviation of Pain by Psychotherapeutic Means" is an important chapter in which an effort is made to clarify the possible role of psychoneurosis in pain, both from the standpoint of etiology and treatment. Other chapters include discussions of physical therapeutic methods, orthopedic methods, neurosurgical methods and roentgen therapeutic methods of pain alleviation.

Part III, which is the largest portion of the book, consists of 831 pages and is devoted to "Pain Syndromes." This includes the neuralgias, pain due to peripheral vascular disease and pain associated with cancer and other neoplastic diseases, as well as several other important and interesting chapters. Of interest to everyone in dentistry, whether in general practice or oral surgery, is the chapter on neuralgias of the face, head and neck. The author covers in careful detail not only the major type of neuralgias but also the so-called atypical type.

Although *The Management of Pain* is broad and inclusive enough to cover all

branches of medicine, it will fit well into any dental library. Discussion of the problems arising in the face, mouth and jaws is well done, but of greater importance is a well-rounded concept of pain every reader must obtain from the study of these pages. The lasting impression one gets from this fine book is the importance of wide knowledge not only of the mechanics of nerve block but also of psychosomatics, physiology and organic disease.—*Fred A. Henny.*

■ Bacteriology for Students of Dental Surgery. By R. B. Lucas and I. R. H. Kramer. 262 pages with illustrations. London, J. and A. Churchill, Ltd., 1954.

This book, primarily designed as a text for dental students, is illustrated with excellent photographs and diagrams. The most striking feature of the book is its brevity. It is unfortunate that brevity in a book of this type must lead to incompleteness. Very few pages are devoted to a discussion of lactobacillus organisms, the bacteriology of dental caries and periodontal disease; the general flora of the oral cavity is hardly mentioned.

The chapters concerned with morphology, methods, relation of bacteria to disease, infection, immunity and chemotherapy are well written and could serve as a review but not as primary teaching material.

The chapter on sterilization suffers the most from brevity. The paragraphs on cold sterilization are incomplete, and the methods and materials described are outmoded. The discussion of specific technics for dental instruments falls far short of being adequate.

The chapter about specific classes of bacteria such as pneumococci, diplococci and clostridia are well written but are not broad enough to be adequate.

There is no bibliography. It is, therefore, impossible to supplement the text by reading the current literature without first preparing a bibliography. *Bacteriology for Students of Dental Surgery* would not make a valuable addition to a professional library.—*William F. Via, Jr.*

■ Morris' Human Anatomy. By J. Parsons Schaeffer, M.D., Ph.D., Sc.D. Eleventh edition. 1,718 pages with 1,220 illustrations. Index. Price $16. New York, The Blakiston Company, 1953.

This large volume is one of the most readable texts in gross anatomy. Since the advent of the first edition in 1893, this treatise has continually embodied the latest and accepted descriptions in the field of anatomy.

The main text, as is true of all anatomical texts, is primarily a descriptive anatomy of the human body, with the usual formal stress placed on topographical, regional anatomy, and on systematic anatomy. New and effective illustrations have been added and many of the chapters rewritten and revised.

The 13 explanatory sections with related material derived from the sciences of anatomy, histology, embryology and dentistry emphasize the unity of the sciences.

In a treatise of this size, a few omissions are unavoidable. For example, figure 396 (page 462) presents an incorrect picture of the triangular space in relation to the scapular muscles and the long head of the triceps.

In figure 104 (page 119) the proper insertion of the temporal muscle is not shown. Both the superficial and deep tendons should reach downward to the posterior end of the mandibular alveolar process of the lower third molar tooth, with the retromolar fossa of the mandible between the superficial and deep tendons free from the insertion of the temporal muscle.

The strength of this text lies in its unified and basic approach to the field of anatomy, in its scholarly presentation and in the excellence of its illustrations. It is highly recommended.—*G. M. Matsumoto.*

■ INTERMEDIATE TREATMENT OF MAXILLOFACIAL INJURIES. J. E. Chipps, R. G. Canham and H. P. Makel. U. S. Armed Forces M. J. 4:7 July 1953.

Military surgery is generally concerned with either emergency or definitive care in the medical chain of evacuation of the wounded. In the Korean campaign, however, the Army hospitals in Japan were able to develop an intermediate treatment of trauma on the scale of the mass evacuation of casualties. The air transportation developed for the evacuation of patients to Japan and the Army hospitals set up there made elaborate facilities and specialized staffs readily available even for the combat zone.

During the periods of the Pusan bridgehead, the rapid advance to the Yalu River area and the subsequent withdrawal to the "meat-grinder" line, the medical facilities in Korea were employed primarily in purely life-saving methods and in the preparation of patients for early evacuation to Japan, where often even primary treatment was given. In the following months of combat on the eventual truce line, oral surgeons were placed in almost all mobile Army surgical hospitals and evacuation hospitals in Korea. The results obtained in cases of maxillofacial injuries when proper débridement, closure and fracture reduction were provided in the first 24 hours after injury were much superior to the results obtained when the primary treatment was delayed until the patients reached Japan.

During the period from August 1950 to February 1953, service by the senior author (J. E. C.) in the largest Army hospital in Japan provided an opportunity for observing and treating a large number of maxillofacial injuries, including 1,000 osseous fractures.

In the management of wounds, conservative débridement followed by immediate closure and supported by chemotherapy was the procedure of choice. Early closure of maxillofacial injuries obstructed avenues of contamination, resulted in minimal scarring, reduced the need for nursing care, permitted earlier return to satisfactory methods of feeding, and improved morale. Despite these advantages, 30 per cent of the wounds involving the mouth failed to heal in whole or in part for the following reasons: lack of provision for drainage, improper or inadequate use of bandages, failure to suture oral surfaces of the wound, secondary hemorrhage, secondary manipulation of a repaired wound, and inadequate chemotherapy.

Whenever possible, maxillofacial wounds were closed without delay. If necessary, the closure was a phase of intermediate treatment rather than a primary measure. The types of closures utilized were: direct closure, skin-graft closure (if primary loss of superficial tissue exceeded loss of deep tissues), and suturing of skin to mucosa (when much facial tissue had been avulsed).

In an intermediate general hospital, the major phases of the treatment program for management of maxillofacial injuries were: examination and treatment planning; first operation débridement of wound and stabilization of fracture; preclosure period (antibiotic treatment, wet dressings, redébridement, prevention of food debris in oral wounds through the use of Levin tubes and a gastrostomy, and final fixation of the fracture); closure; postclosure period. The preclosure period was about six days and the postclosure period about eight days. The patient was then ready for evacuation to the United States for definitive care.

During the Korean campaign, tracheotomies were employed in 113 cases of maxillofacial injuries in Korea and in 6 cases after arrival at the Tokyo Army Hospital. The evacuation of casualties by helicopter—frequent in Korea—made it necessary for patients to travel unattended during a critical stage of a wound involving the airway. Therefore, the liberal use of prophylactic tracheotomies was justified; no deaths were attributed to this procedure. In fact, during air evacuation there

were no deaths that could be attributed to asphyxiation—an impressive record, in which the prophylactic tracheotomy played an important part.

In 11 cases secondary hemorrhage occurred as a result of infection or of secondary trauma from retained foreign objects or bony spicules. All of these occurred between the ninth and the eleventh post-injury days. Therefore, it became customary to anticipate secondary hemorrhage in patients with infected wounds near major blood vessels, to have tracheotomy appliances and equipment for control of hemorrhage ready, and to postpone evacuation to the United States until after the critical period.

Patients fed with a Levin tube appeared physically stronger and lost less weight, their oral wounds were ready for closure earlier, and the postoperative healing period was shorter. These results were attributed to less salivation, better immobilization of the wound, absence of fermenting food debris in the wound and better retention of bandages.

Endotracheal intubation for administration of nitrous oxide and oxygen in conjunction with intravenous thiopental sodium proved to be an excellent anesthetic regime. If the patient had a tracheotomy prior to anesthesia, a modified tracheotomy tube was used that was designed for direct attachment to the anesthetic tubing.

Débridement of bone fragments was conservative. Bone fragments that flushed free when the wound was flushed with a stream of normal saline were removed. None of the few subsequent sequestrectomies were attended by harmful sequelae. The natural immunity of the tissues and the rich blood supply of the maxillofacial tissues contributed to the survival of many doubtful fragments.

The use of acrylic splints constructed against the lingual surface of the mandibular arches and retained by use of continuous loop interdental wires through holes prepared at the interproximal embrasures was of great value. Frequently supplementary circumferential wires were used.

An analysis of 1,000 fractures showed that 679 were due to missiles, 113 to vehicular accidents, 98 to fights, 44 to blunt instruments, 38 to trips and falls, 13 to organized athletics, 11 to blasts and explosions, 2 to pathologic lesions and 2 to dental extractions. Of the maxillofacial fractures, 70 per cent were incurred in combat. —*Charles C. Alling.*

■ Intra-Arterial and Intravenous Transfusion. James V. Maloney, Jr., Cheves McC. Smythe, Joseph P. Gilmore and Stanley W. Handford. Surg., Gynec. & Obst. 97:529, 1953.

A study was made of the relative effectiveness of intravenous and intra-arterial transfusion in treatment of hemorrhagic shock in a series of 64 dogs. The experiments were designed to evaluate objectively the favorable clinical results reported with the use of intra-arterial transfusion. The following observations were made:

1. The hydraulic effect of intra-arterial transfusion in elevating arterial pressure is significant at rates of transfusion which are presently employed clinically.

2. The recovery of arterial pressure is a function of the rate of transfusion and not of the route of administration.

3. In typical hemorrhagic shock both types of transfusion are equally effective in restoring the low cardiac output.

4. No evidence of pooling of the infused blood was found with either intra-arterial or intravenous transfusion.

5. Changes in venous pressure and the occurrence of heart failure were unrelated to the route of transfusion.

6. In resuscitation from asystole, intra-arterial transfusion has some theoretic advantage over intravenous transfusion. In the present experiments, both methods of transfusion were found to be effective in restoring cardiac contraction. The relative effectiveness of the two methods was not determined. Intra-arterial infusion was assumed to initiate heart beat by perfusion of the coronary arteries; however, suggestive evidence was obtained to indicate that under some circumstances it may act by means of the venous system.—*K. Tessler.*

■ THE USE OF CORRECTIVES IN THE PREVENTION OF BARBITURATE INTOXICATION. Theodore Koppanyi and Joseph Fazekas. Am. J. M. Sc. 226:597 Dec. 1953.

The term "corrective" in modern therapeutics has become obsolete largely because it was thought to involve a concept of empirical rather than of rational therapeutics. This term should be redefined, particularly in view of the introduction of potent, effective and potentially toxic therapeutic agents that produce many undesirable side actions which can be prevented by the simultaneous administration of another drug. A corrective is a drug that protects the patient against the undesirable side actions or overdosage of another drug without interfering with its intended therapeutic effect. A corrective is especially useful in the prevention of acute barbiturate poisoning.

Analeptics, that is, stimulants of the central nervous system, have long been used in the treatment of acute barbiturate intoxication. Their employment, however, as corrective additives to pharmaceutical preparations of barbiturates in order to prevent or minimize the dangers of overdosage is a novel concept. It has been common clinical experience that the prognosis of acute barbiturate poisoning depends to a great extent on the time interval elapsing between the ingestion of the poison and the initiation of treatment, whether symptomatic or analeptic.

It is concluded that the simultaneous administration of such an analeptic and a barbiturate will yield the best results. Hence, if a specific amount of analeptic is added to a given barbiturate preparation, a certain degree of protection will be conferred on a patient in case he should ingest a toxic or a fatal dose of a barbiturate.

Criteria have been established for correctives which are to be added to barbiturates. Up to this time, only pentylenetetrazol and picrotoxin have been found to meet the criteria for the ideal corrective; pentylenetetrazol appears clinically and pharmaceutically to be the most suitable corrective for routine clinical use.

Critical ratios have been established for combining pentylenetetrazol with phenobarbital sodium at 3:2 and pentylenetetrazol with pentobarbital or secobarbital sodium at 3:1.—*Myron Kaufman.*

■ CRANIO-FACIAL THROMBO-PHLEBITIS. P. Cernea and J. Laufer. Rev. de stomatol. 54:1017 Nov.-Dec. 1953.

The pathway of the facial, angular, opthalmic veins, through which infection reaches the cavernous sinus, and the pterygoid pathway comprise the two main routes by which a thrombophlebitis of dental origin may reach the endocranium.

The pterygoid pathway has three possible courses: (1) the pterygo-ophthalmic pathway through veins anastomosing with the ophthalmic vein, (2) the pterygocavernous pathway through emissary veins associated with nerves in their foramens as they exit from the skull and (3) the pterygomeningeal pathway reaching the middle cerebral fossa. These three pterygoid routes were identified in 67 per cent of the cases where the pathway was determined; and, unexplainably, the left side was most frequently involved.

Exocranial phlebitis involves the facial, ophthalmic and frontal veins. Endocranial phlebitis involves the cavernous sinus and the upper sagittal sinus. Accompanying symptoms are venous stasis in the scalp and forehead, cranial hypertension with papillary stasis, headache and vomitus and often also neurological symptoms of the hemiplegic or epileptic type. All types of endocranial phlebitis commonly cause high fever, thrills, fast pulse and a poor general condition.

The procedure to treat the condition effectively should include the removal of the primary cause, the culture and analysis of the responsible organism, lumbar puncture or hemoculture if necessary, and the administration of an effective dose of antibiotics. Adequate dosage of heparin or Dicumarol with frequent testing of bleeding and clotting time should be employed. The antibiotics should be started without waiting for the laboratory reports. The mortality resulting from this condition has been greatly reduced by the use of sulfonamides and antibiotics.—*Jacques Levignac.*

■ Lymphosarcomas of the Jaws. H. Cadenat and H. Planel. Rev. de stomatol. 55:113 March 1954.

When a lymphosarcoma occurs in the maxillary sinus, it penetrates the cortical plate in the same manner as other malignancies but differs from them in that it is faster-growing and is more common in young patients.

In the mandible, the tumor exhibits a tendency to expand toward alveolar bone rather than to penetrate the heavy cortical plate. In the 15 studies, the tumors usually occurred at the angle of the mandible, but were observed in the alveolus in a few cases.

Bilateral and symmetrical multiple regions of growth developed simultaneously in the maxilla and the mandible. A physical examination revealed adenopathy; the patient was pale and feverish. The diagnosis was confirmed by roentgenograms, a blood examination, a myelogram and a biopsy.

The involvement of the lymphoid tissues explains the occurrence of lymphosarcomas in young patients. There are three types of lymphosarcomas: lymphocytic, lymphoblastic or giant-cell. The prognosis is very poor. Irradiation will bring about a recession of the tumors, but metastasis eventually causes death.—*Jacques Levignac.*

■ About Temporomandibular Joint Ankylosis. M. Aubry and Palfer. Semaine des hopitaux 30:160 April 1954.

Total ankylosis is a condition of the temporomandibular joint in which there is no motion in the joint. Associated with this condition is a bony mass in the joint region. Nearthrosis is a condition in which there is limited movement of the joint and the excess bone involves the zygoma and condyle.

Planigraphy is valuable for a correct determination of the location and size of the structure in the vertical, sagittal and transverse planes. The information provided by these records permits construction of an acrylic prosthesis for restorative purposes.

The prosthesis, which is designed to prevent outward displacement, prevents also a recurrence of ankylosis and the shortening of the ramus on the operated side. In the operation, a 1 cm. section of bone is removed to obtain satisfactory motion. The incision is made behind the tragus. A special retractor is used as well as fissure burs and rongeur forceps for the resection. The patient is allowed to chew the day after surgery.—*Jacques Levignac.*

■ The Misuse of the Prolabium in the Repair of Bilateral Cleft Lip. William Milton Adams and Lorenzo H. Adams. Plast. & Reconstruct. Surg. 12:225 Oct. 1953.

Operations for repair of bilateral cleft lip are of two general types: (1) those in which the prolabium is shifted upward to form the columella and the central portion of the lip is formed wholly or in part by the suture of the lateral segments in the midline and (2) those in which the prolabium alone is utilized for the central segment.

Most of the operations which have been recommended for the repair of a bilateral cleft lip utilize the prolabium for the upper portion of the central segment; the lower part of the lateral segments is joined in the midline below the prolabium. Such procedures when employed for infants or for children possess the same disadvantage in varying degree; an excessive elongation of the upper lip. A more satisfactory procedure is to employ an operative technic utilizing the prolabium to form the central portion of the lip with only minimal undermining and rearrangement of the columella and the alar cartilage. The tip of the nose may continue to be flattened, but this deformity is less serious than the elongation of the lip and is more easily corrected in later life if the patient desires it.—*K. Tessler.*

Announcements

■ Full Scientific and Entertainment Program Planned for Association Annual Session

A full scientific and entertainment program has been planned for the Association's 95th annual session to be held in Miami, Fla., November 8-11. Heavy advance registration indicates that the Miami meeting will be one of the best attended in the Association's history.

Leading scientists will take part in the panel discussions, the Council on Scientific Sessions has announced. Panel subjects are elastic impression materials, the effect of sugar and other carbohydrates on teeth, newer devices for cutting tooth structure and radiation hazards in the dental office. The new film, *Hazards of Dental Radiography*, produced by the Association's Research Fellowship at the National Bureau of Standards, will be shown. Also to be discussed is the dentist's role in atomic bomb disaster. An innovation of the scientific session will be the projected clinics, in which the clinician will illustrate his subject by means of visual aids such as slides.

Among the events on the entertainment program, are the fraternity banquets, the President's dinner and a tour of Vizcaya, the James Deering 69-room castle-fortress.

■ Essays, Motion Pictures, Symposium Scheduled by Oral Surgeons

The scientific session of the annual meeting of the American Society of Oral Surgeons scheduled for November 3-6 in Hollywood, Fla., will consist of motion pictures, essays and a symposium. The Society is also planning 51 lecture courses to be given by members of the Society and invited guests. Candidates scheduled to appear for membership examinations are invited to attend the scientific program.

■ Academy of Implant Dentures Schedules November Meeting

The American Academy of Implant Dentures will hold its next meeting at the Biltmore Terrace Hotel in Miami Beach, Fla., November 6 and 7. E. J. Kresse, Academy secretary, has announced that applications for membership and reservations for the meeting may be made until October 6. Reservations may be made by writing to William E. Barb, convention chairman, 668 E. Maple Road, Indianapolis.

■ December Date Set for Oral Pathology Examination

The American Board of Oral Pathology will conduct an examination for certification December 12 in the laboratory of oral pathology, School of Dentistry, University of Pennsylvania, in Philadelphia. Inquiries about the examination may be addressed to the secretary of the Board.

■ Oral Pathology Institute Plans Reiss Lecture

The New York Institute of Clinical Oral Pathology announces that the third Herman L. Reiss Memorial Lecture will be held at the New York Academy of Medicine October 25. Raymond J. Nagle, dean of the New York University College of Dentistry, will lecture on the function of the temporomandibular joint.

■ Injunction Issued to Stop Sale of Outdated X-ray Film

The U.S. District Court for the southern district of New York has issued a temporary injunction prohibiting the Paramount Dental Supply Company of New York from further sale of outdated x-ray film. The Federal Trade Commission also is reviewing the firm's activities to see whether there has been a violation of federal law. In addition, the A.D.A. Council on Dental Trade and Laboratory Relations announced that the agency in charge of disposing of Army surplus film has agreed not to sell any more outdated dental x-ray film until such time as safeguards are established to assure its sale as scrap.

■ Cuban Dentists Plan Tour for A.D.A. Miami Delegates

An invitation to Association delegates to visit Havana, Cuba, has been issued by the Colegio Estomatológico Nacional. The Cuban Dental Society has planned special tours from November 12-16, to follow the Association's 95th annual session in Miami. The tours by airway or ship include transportation, hotel reservations, meals and side tours through Cuba. The trips coincide with the opening session of the fourth national convention of the Cuban group, and Association members are welcome to attend the convention as well. Further information may be obtained from Antonio Montero, Housing Bureau, Colegio Estomatológico Nacional, Edificio Retiro Odontológico, Vedado, Havana, Cuba.

■ Essayists Featured at Academy Meeting

Three essayists will be featured at the ninth mid-annual meeting of the American Academy of Dental Medicine December 5 in New York City. They are Harry Sicher of Loyola University School of Dentistry (Chicago), who will discuss bone formation and resorption; J. P. Weinmann of the College of Dentistry, University of Illinois, who will speak on variations in the structure of bone tissue and their significance in roentgenology, and Lester Cahn of the School of Dental and Oral Surgery, Columbia University, who will discuss the correlation between clinical, roentgenological and histological studies of bone lesions.

■ Case History Service of Institute of Dental Medicine Available to Association Members

Case histories in the field of dental medicine for the year 1953-54 are being offered Association members by the case history service of the American Institute of Dental Medicine. The case histories are accompanied by 35 mm. Kodachrome slides showing the oral condition. In addition, pertinent laboratory findings, the medical background, roentgenograms, histologic slides and photomicrographs are included. Further information may be obtained from Marion G. Lewis, executive secretary, 2240 Channing Way, Berkeley, Calif.

■ Round Table Forum Planned for Institute Meeting

The American Institute of Dental Medicine will meet in Palm Springs, Calif., October 31 to November 4. A round table forum is planned as a feature of the meeting.

Gordon M. Fitzgerald of the University of California will speak on various aspects of roentgenography; Maynard K. Hine of Indiana University, on the treatment of periodontal disease; Ernest Jawetz, M.D., of the University of California, on virus infections of interest to the dentist; Joseph

P. Weinmann, M.D., of the University of Illinois, on adaptation of the periodontal membrane to physiologic and pathologic changes; William A. Albrecht, Ph.D., of the University of Missouri, on soil and nutrition, and Charles H. Best, M.D., of the University of Toronto, on the history and action of insulin.

■ James R. Lisa Award Presented to Dentist

A report by Clarence M. Calman entitled "Hemangio-endothelioma of the Palate" has won the first James R. Lisa award. This award is to be given annually to the New York City Hospital resident doctor who presents the best case report essay of the year.

Dr. Calman's report dealt with a case treated on the oral surgery service of the New York City Hospital under the direction of Pincus Sherman. The $100 award was presented to Dr. Calman by Dr. Lisa, sponsor of the award and chief pathologist of the City of New York. The presentation was made at the annual meeting of the medical board of the hospital May 17.

■ Veterans' Benefits Approved for Dental Study Programs

Veterans enrolled or wishing to enroll in dental internship and residency programs leading to preparation for examination by specialty boards approved by the American Dental Association Council on Dental Education may receive benefits under Public Law 550 as a result of revisions in the law announced by the Veterans Administration in June. The internship and residency programs must be those approved by the Council on Dental Education. Previously regulations did not authorize the awarding of benefits to dental interns.

Lists of the internship and residency programs approved by the Council have been forwarded to the regional offices of the VA.

■ Schools Schedule Courses for Oral Surgeons

The University of Louisville School of Dentistry in cooperation with the Louisville General Hospital announces two six months' courses in general anesthesia for graduate dentists. Trainees have the same privileges as first year residents in anesthesia and are required to administer anesthetics for both major and minor surgery as well as for dental anesthesia.

On the student's completion of the course, the American Board of Oral Surgery may grant three months' credit toward the clinical requirements of the Board. The course begins March 1, 1955.

Loyola University School of Dentistry (Chicago) announces a course in oral surgery October 11-16. Students will perform various types of operations on cadavers, including open and closed reduction of mandibular fractures, partial resection of the mandible with bone grafting and resection of the maxilla for tumors. Attendance is limited to six. Only practicing oral surgeons will be accepted.

Offered at Tufts College Dental School in Boston are two courses of interest to the oral surgeon. A course in minor oral surgery will be given each Wednesday from October 13 to December 1 and a course in general anesthesia Wednesdays from December 15 to February 16.

New York University College of Dentistry, in conjunction with the Bellevue Medical Center, is offering two residencies, two assistant residencies and eight internships in oral surgery. Also offered is a one year graduate course in related basic sciences.

Editorial communications

■ ORIGINAL COMMUNICATIONS—This journal invites concise original contributions in the broad field of clinical and experimental surgery of the mouth and associated structures, including roentgenology, diagnosis, anesthesia and oral surgical pathology. Articles are accepted for publication with the understanding that they are contributed solely to the JOURNAL OF ORAL SURGERY. All manuscripts are subject to editorial modification. Neither the editors nor the publishers accept responsibility for the views and statements of authors expressed in their communications.

■ MANUSCRIPTS—Manuscripts submitted for publication should be sent to Fred A. Henny, Editor, Henry Ford Hospital, Detroit, Michigan.

Manuscripts should be typewritten on one side of the paper only with double spacing and liberal margins. The author's name and the abbreviated title of the article should appear at the top of each manuscript page. The original should be sent to the editor and a carbon copy retained by the author. Manuscripts will not be returned if accepted for publication.

References should be placed at the end of the article and should conform to the style of the Quarterly Cumulative Index Medicus; viz., name of author, title of article and name of periodical with volume, pages, month and year. They should be numbered and should appear in the same order as that of the superior figures inserted in the appropriate positions in the text.

■ ILLUSTRATIONS—Illustrations accompanying manuscripts should be unmounted and numbered. The author's name should appear on the margin or back.

Authors should insert figure numbers at appropriate places in the text. The original drawings, or glossy print photographs of them, should accompany the manuscript. Legends for illustrations are to be typewritten in a separate list with numbers corresponding to those on the photographs and drawings.

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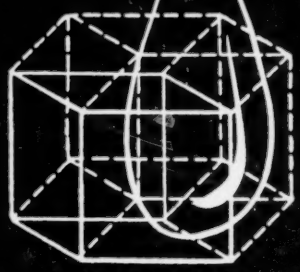

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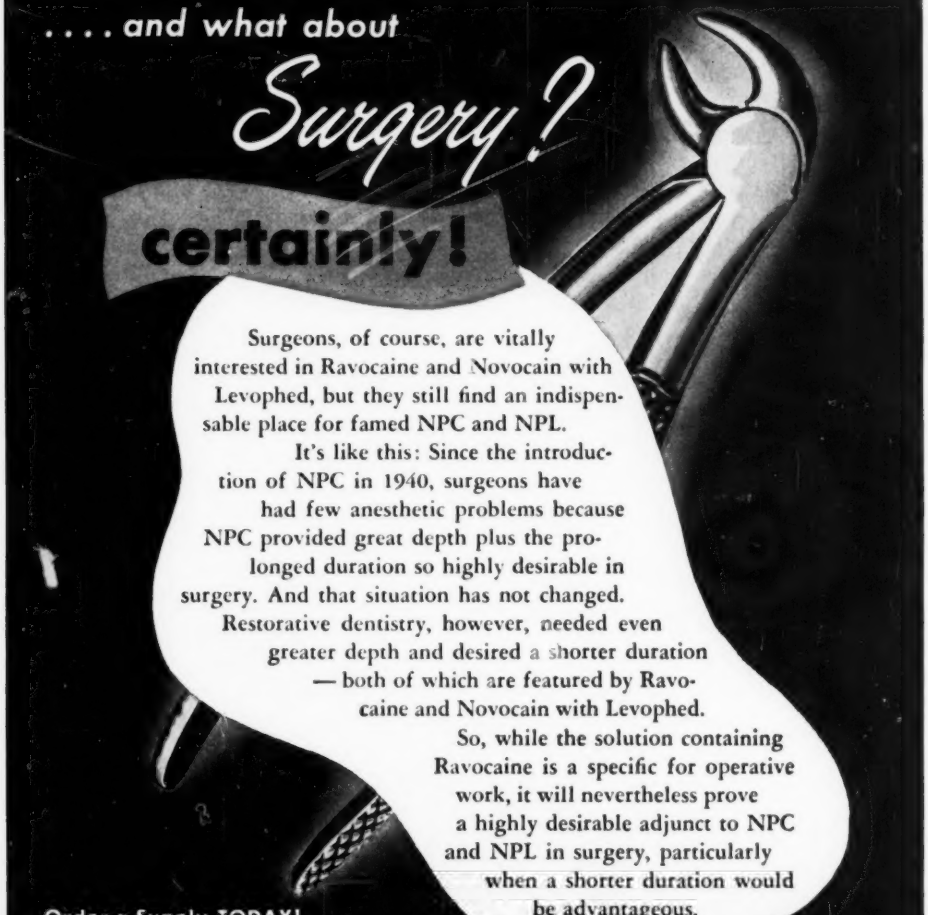

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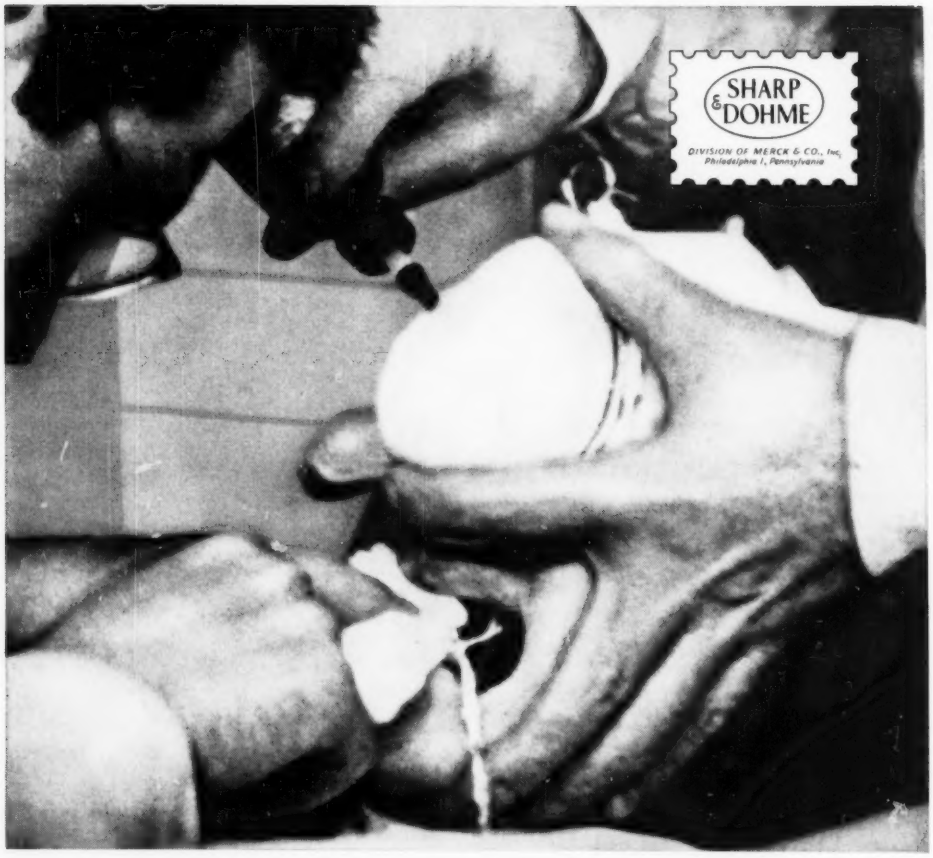

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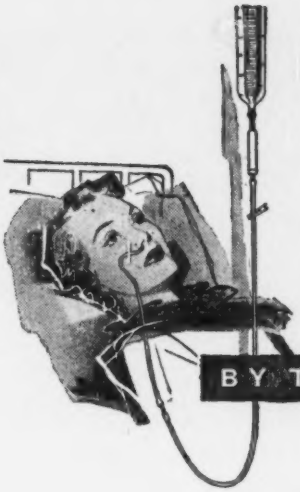

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